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Pipes, Tubes and Syphons; Joining Pipes.—J. E. Hunt, 4487. M. Benson (com.), 4538. R. C. Robinson, 4584. T. Proud, 4667. A. Barlow and W. Iden, 4700. B. L. Brown, 4724. R. S. Robinson, 4800. J. Gresham, 4805. G. Robertson, 4809. A. Silbermann, 4865. B. Hunt (com.), 4824.

Pistons, &c.—A. Oldham, 4826.

Plants, Trees, &c.—M. Benson (com.), 4654.

Plates, Dishes, &c.—T. Thorns, 4557.

Ploughing, Digging, Clod Crushing, Land Rolling, Harrowing, Agricultural Implements, Tilling and Cultivating Land.—J. Sparks, 4360. C. and W. Cottis, 4511. L. A. Aspinwall, 4517. H. Conradi (com.), 4784. J. and A. Macdonald, 4845.

Preserving and Preparing Articles of Food.—G. Lockie, 4514. J. Jeyes, 4636. W. Rollason, 4756.

Presses; Compressing.—R. H. Tweddell, 4535. W. Oram and W. Hartley, 4674. A. M. Clark (com.), 4707. H. Staples and T. S. Wilson, 4725.

Printing and Transferring; Type and other Surfaces for Printing, Composing, and Distributing Type.—W. Birch, 4368. E. B. Andrews, 4504.

Propelling Carriages.—H. Conradi (com.), 4567. J. Scott, 4750.

Propelling Machinery, Transmitting Power and Motion, Converting Movements.—J. A. Longridge, 4389. L. Garrick, 4397. S. Louis (com.), 4565. T. D. C. Leveritt (com.), 4663. J. Scott, 4750. T. Lawson, 4759.

Propelling Ships, Propellors, Paddle-wheels, and Screws.—G. W. von Nawrocki (com.), 4440. H. F. Knapp, 4441. J. Scott, 4750.

Pumps, Pumping and Raising Water and other Liquids, Pumps, Pistons, and Packing.—L. Garrick, 4397. E. G. Sheward and J. Gresham, 4436. G. W. von Nawrocki (com.), 4440. J. S. and T. A. Walker, 4488. C. J. Galloway and J. H. Beckwith, 4617. F. Jones, 4622. G. W. von Nawrocki (com.), 4688. O. Rommel, 4703. J. E. Hodgekin and M. Newhaus (com.), 4743. F. and S. Pearn, 4768. R. Dunn, 4813. A. Oldham, 4826.

Punching and Perforating.—J. M. Napier, 4485. R. H. Tweddell, 4535. A. M. Clark (com.), 4846.

Rags and Waste, Separating Fibres from Fabrics.—D. Pirie and A. Cable, 4376. J. Petrie, 4611. W. Boggett, 4772.

Railways, Permanent Way, Rail Joints, Chairs and Sleepers, Portable Railways, Atmospheric Railways, Switches, points, Crossings, and Turntables.—F. R. Wheeldon and B. Ford, 4400. G. Levick and F. C. Winley, 4537. J. C. Bunten and J. Livesey, 4579. J. S. Williams, 4853.

Railways, Carriages, Coupling, Uncoupling, and Altering Position of Carriages and Engines.—G. A. Walker, 4405. H. Conradi (com.), 4406. R. H. Marten, 4569. F. McD. Robertson, 4641. U. Gibford (com.), 4752.

Reaping, Mowing, Making Hay, Gathering in Produce.—W. McI. Cranston (com.), 4363. A. Wilson, 4475. E. C. Blackstone, 4670. M. T. Neale, 4745. H. Conradi (com.), 4784. J. Howard and E. T. Bousfield, 4802. W. McI. Cranston (com.), 4837. J. and A. Macdonald, 4845.

Refrigerating, Cooling Liquids, Making Ice.—W. Clark (com.), 4434. F. G. Fleury, 4714.

Registering, Indicating, and marking.—J. J. Kennedy and W. Anderson, 4469. W. S. Stafford and T. Dalgleish, 4640. L. Butler, 4801. W. R. Lake (com.), 4844. W. S. Hall, 4851.

Resins, &c.—W. Boggett, 4772.

Retorts and Crucibles, &c.—A. M. Clark com.), 4556.

Road making and paving, Cleaning Streets.—H. Reid, 4495.

Ropes, Cordage, Twine, Oakum, Wire Ropes.—D. Pirie and A. Cable, 4376. B. Boggett, 4772.

Sewing and Embroidering.—W. Harrison, 4526. E. T. Hughes (com.), 4545. J. E. Bertin, 4564. S. Louis, 4565. E. de Pass (com.), 4585. W. Cook and S. Hill, 4592. H. Webster, 4783.

Shears, Scissors, Clipping and Shearing Animals.—C. Tebbitt (com.), 4760.

Ship and Boatbuilding.—C. D. G. Dresser, 4361. J. H. Small, 4424. J. Humphrey, 4497. G. V. Fosbery, 4503. F. Marley, 4570. E. Thompson, 4590. R. Turnbull, 4676. A. M. Clark (com.), 4727. A. H. Hamilton, 4792. C. W. Siemens, 4793. G. Robertson, 4809.

Ships' Boats (Lowering, &c.)—E. Thompson, 4590.

Ships' Cargoes (loading and unloading).—P. J. Wates, 4737.

Shuttles.—J. Haddock, 4525. J. Leadbeater, 4817.

Signals, Alarms, Conmunicating Apparatus, Conveying Sounds.—T. J. Smith (com.), 4415. H. Morris, 4417. J. S. Campbell, 4437. L. J. Guano, 4478. W. A. How, 4730. H. J. Haddan (com.), 4754. J. Robertson, 4828. J. S. Williams, 4853.

Smoke (Preventing, &c.)—R. Searle, 4547.

Sowing Seeds, &c.—W. M. Murray (com.), 4476.

Spades, Shovels, &c.—J. Lee, 4786.

Spindles; Spindles and Flyers.—J. Nicoll, 4840.

Spinning and Preparing for Spinning.—W. Walton, 4373. W. Brooke and B. Booth, 4373. E. Crawshaw and J. Smith, 4392. B. Booth, 4448. A. M. Clark (com.), 4508. G. Bernhardt, 4560. G. Horner, 4561. J. Walker, 4602. W. F. Bateman, 4610. H. A. Bonneville (com.), 4625. G. W. Robertson, 4630. J. Mills, 4686. W. E. Gedge (com.), 4696. R. Beecroft and F. H. Wright, 4705. R. Grime, 4729. T. Lawson, 4759. T. M. Eccles and W. Walker, 4779. R. Thornton, 4791. J. Kay, 4827. J. Chisholm, 4836. J. Nicoll, 4840. J. and R. Weir, 4842.

Springs.—L. Sterne and J. B. Handyside, 4519. J. B. Armstrong, 4620. E. W. Cooper, 4742.

Steam and other Boilers, Cleaning and Preventing Incrustation of Boilers, Water Feeding Apparatus for Boilers.—W. R. Lake (com.), 4379. W. Laurence, 4426. N. P. Burgh, 4433. E. G. Sheward and J. Gresham, 4436. A. H. Seligmann, 4445. E. de Loriere, 4506. H. L. and G. Baxter and L. Rushworth, 4562. W. J. Fernie, 4586. J. Watson, 4629. L. T. de Froideville and H. Taponier, 4638. J. Blake, 4665. J. H. Johnson (com.), 4695. A. Jay, 4717. M. J. Roberts, 4795. G. Robertson, 4809. C. Tyson, 4811. H. Widmark, 4848.

Steam Engines (Stationary, Locomotive, and Marine.)—N. P. Burgh, 4433. A. H. Seligmann, 4445. C. G. Beechey, 4474. D. F. Underwood, 4304. F. W. Fox and C. Walker, 4652. W. Oram and W. Hartley, 4674. C. Burrell and R. Edwards, 4812. C. Torkington and J. Heys, 4821. C. L. Strube, 4823. H. W. Widmark, 4848.

Stone and Slate, Artificial Stone and Marble, Grindstones and Millstones.—J. Halley, 4582. J. D. Brunton, 4591. J. K. Gulland, 4841.

Straps, Driving Bands, and Belting for Machinery.—G. Mudford, 4540.

Sugar and Syrups, &c.—C. D. Abel (com.), 4647. J. H. Johnson (com.), 4671, J. H. Johnson (com.) 4672. H. H. Murdoch, 4682. H. H. Murdoch, 4726.

Telegraphs; Telegraph Printing Apparatus.—J. A. Ewing and F. Jenkin, 4402. T. Wiesendanger, 4418. L. M. de B. Y. O'Lawlor, 4468. G. A. Schoth, 4500. M. T. Sale, 4608. C. H. Siemens (com.), 4685. B. Hunt (com.), 4824. C. A. McEvoy, 4847.

Tobacco and Snuff, Cigars, Cigar-holders, Pipe and Cigar-lighters, Smoking-pipes, Tobacco-pouches.—J. H. Johnson (com.), 4394. W. L. Wise (com.), 4451. H. J. Haddan (com.), 4460. M. M. Franzini, 4533. R. Golding, 4607. W. L. Hubbell and F. Ochs, 4798.

Tools, Tool Holders.—J. Underhill, 4623.

Torpedoes.—G. V. Fosbery, 4503. C. A. McEvoy, 4578. A. M. Clark (com.), 4727.

Tramways and Tramway Carriages, Tramway Locomotives.—A. H. Seligmann, 4445. C. A. Edge, 4523. G. Levick and F. C. Winley, 4537. F. Marley, 4570. V. J. Fallart, 4571. F. W. Fox and E. Walker, 4652. H. W. Widmark, 4848. E. Bottcher, 4852.

Trimmings.—W. E. Gedge (com.), 4447.

Umbrellas, Parasols, &c.—T. Warwick, 4521. E. Atkins, 4711. J. G. Owen, 4723. A. M. Clark (com.), 4728. J. S. Mignot, 4733.

Upholstery (Mattresses, Beds, Cushions, Curtains, &c.)—J. Lindley, 4416. W. M. Green and W. Jack, 4439.

Valves, Taps, Stop Cocks, Plugs; Regulating the Flow and Pressure of Fluids.—J. Gordon, 4423. H. Harrison, 4449. P. S. Justice com. 4454. P. Cullen and P. McKellar, 4463. C. G. Beechey, 4474. J. S. and T. A. Walker, 4488. W. Carr, 4593. J. Platt, 4594. A. Cozza, 4621. W. Davies, 4643. J. Blake, 4665. T. Proud, 4667. J. Dangerfield, 4668. J. E. Hodgkin and M. Neuhaus (com.), 4743. F. and S. Pearn, 4768. M. J. Roberts, 4795. J. Longshaw, 4825.

Velocipedes.—J. P. Kershaw, 4539. R. Mothersill, 4612. J. S. Smith, 4687. R. Harrington, 4702. J. Elliott, 4818. J. Turner, 4849.

Ventilation; Supplying and Purifying Air for Buidings, Mines, Ships, Carriages, &c.—J. Munro, 4365. L. F. Marsh, 4507. J. McL. Dobson, 4541. R. Searle, 4547. H. B. Barlow (com.), 4549. R. E. Villiers, 4581. M. Benson (com.), 4654. E. Dunn, 4678. C. R. Stevens, 4734.

Washing, Cleansing, and Wringing Fabrics, Yarns, and Materials.—J. Lawson, 4512. W. Carr, 4593. J. Petrie, 4611. J. Jeyes, 4636. J. E. Davies, 4699.

Waterclosets, &c.—W. Davies, 4643. A. Sweet, 4722.

Waterwheels and Engines, &c.—G. W. von Nawrocki (com.), 4440. W. Oram and W. Hartley, 4674.

Wearing Apparel for Gentlemen, Military Outfits, &c.—T. S. Evans (com.), 4383. A. Gottschling, 4738.

Weaving, Braiding, Plaiting, Preparing for Weaving.—B. Hansom and E. W. Hirst, 4381. E. O. Taylor, 4431. R. L. Hattersley, J. Hill, and J. Walker, 4483. J. and F. J. Robinson, 4498. J. Haddock, 4525. F. J. Jones, 4597. E. Smith and W. Rothwell, 4598. R. Greenwood and W. H. Hayhurst, 4599. W. Richardson and J. Slack, 4600. D. Hitchen, 4639. E. Phillips and S. H. Kay, 4664. J. and J. E. Newton, 4681. D. Beaumont and J. E. Tate, 4697. E. Tweedale, 4708. T. Longworth and J. Mercer, 4709. T. M. Eccles and W. Walker, 4778. J. Thomas and J. and J. Crabtree, 4790. J. Leadbeater, 4817. W. and G. F. Holroyd, 4835. G. Richardson, 4850.

Wheels for Carriages, &c.—H. Conradi (com.), 4384. H. Conradi (com.), 4406. H. Conradi (com.), 4427. P. Brown, 4481. D. Drummond, 4794.

Winding, Reeling, and Balling Yarn and Thread.—G. Bernhardt, 4560. J. Walker, 4602. J. Nicoll, 4840.

Windows and Sashes, &c.—J. Greenfield, 4375. A. V. Newton (com.), 4450. T. Jones, 4559. J. B. Watts, 4731.

Wire-Working, Wire Ropes, Telegraph Cables.—W. F. Bateman, 4610. G. W. von Nawrocki (com.), 4627. B. Hunt (com.), 4824.

Wood and Veneers, &c.—J. Gardner, 4378.

*** *The above List is prepared from the Patent Records by Mr. T. Morgan, Secretary of the Inventors' Patentright Association, Limited.*

Reviews.

VOLUMETRIC ANALYSIS.

A System of Volumetric Analysis." By Fleicher. Translated from the Second German Edition by M. M. Pattison Muir. Macmillan and Co.

THIS work has reference to the volumetric processes used in the analysis of raw materials employed in the manufacturing arts, and the products obtained therefrom. The novel feature seems to be the estimation of bases without the customary previous separation into groups. By this the analysis is much shortened, not only by the omission of the separations, but also by the fact that one or two filtrations at the most, are necessary; in many cases no filtration being required. Another recommendation is the circumstance that every estimation can be readily controlled by repeating the tituration with the original liquid.

ENGINEERS' VALUING ASSISTANT.

"The Engineers' Valuing Assistant: A Practical Treatise on the Valuation of Collieries, &c., with New Sets of Valuation Tables. By H. D. HOSKOLD, C.E. Longmans and Co.

In this work Mr. Hoskold has effected an an improvement in the preparation of tabular aids to the valuer, that while in the common tables, which give the prices at which annuities may be bought or sold at par, no account is taken of the disparity between the rates allowed and those at which money can in point of fact be invested, every practical combination of rates is taken into account in the present work.

THE SEA.

"The Sea: Its stirring story of Adventure Peril, and Heroism." Cassell, Petter, and Galpin. London, Paris, and New York.

THE great literary enterprizers, Messrs. Cassell & Co., under the above-named title, are now issuing another serial, which, judging from the part we have before us, will be a work of the highest and instruction on a subject, as they truly say, touches the heart of the entire British nation beyond all other subjects. That this work is not a mere collection of tales of the ocean for the entertainment of schoolboys and lovers of stirring narratives (though it is not deficient in this respect) will be apparent when we state that it has already given consideration to the question of Ironclads *v.* Wooden Walls, as also to

THE VOYAGE OF THE "CHALLENGER."

We may commence by saying that no such voyage has ever been undertaken before. Nearly 70,000 miles of the earth's watery surface were traversed and the Atlantic and Pacific crossed and recrossed several times. It was a veritable 'voyage en zigzag.' Apart from ordinary soundings innumerable, 374 deep-sea soundings, when the progress of the vessel had to be stopped, and which occupied an hour or two apiece, were made, and at least two-thirds as many successful dredgings and trawlings. The greatest depth of ocean reached was 4,575 fathoms (27,450), or over five miles. This was in the Pacific, about 1,400 miles S.E. of Japan. We all know that this ocean derives its name from its generally calmer weather ond less tempestuous seas; and the researches of the officers of the Tuscarora, show that the bottom slopes to its greatest depths very evenly and gradually, little broken by submarine mountain renges, except off volcanic islands and coasts like those of the Hawaiin (Sandwich Islands). Off the latter there are mountains in the sea ranging to as high as 12,000 feet. The general evenness of the bottom helps to account for the long sweeping waves of the Pacific, so distinguishable from the short, cup-up, "choppy" waves of the Atlantic. In the Atlantic, on the voyage of the Challenger from Teneriffe to St. Thomas, a pretty level bottom off the African coast gradually deepened till it reached 3,125 fathoms (over three and a half miles), at about one-third of the way across to the West Indies.

If the Alps, Mont Blanc and all, were submerged at this spot, there would still be more than half a mile of water above them. Five hundred miles further west there is a comparatively shallow part, two miles or so deep, which afterwards deepens to three miles, and continues at the same depth nearly as far as the West Indies. A few words as to the work laid out for the Challenger, and how she did it. She is a 2,000 ton corvette of moderate steam-power, and was put into commission, with a reduced complement of officers and men, Captain (now Sir) George S. Nares, later the commander of the Arctic expedition, having complete charge and control. Her work was to include soundings, thermometric and and magnetic observations, dredgings and chemical observations of sea water, the surveyings of unsurveyed harbours and coasts, and the re-surveying, where practicable. of partially surveyed coasts. The civil scientific corps, under the charge of Professor Wyville Thomson, comprised three naturalists, a chemist and physicist, and a photographer. The naturalists had their special rooms, the chemist his laboratory, the photographer hir dark room, and the surveyors their chart room, to make room for which all the guns were removed except two. On the upper deck was another analysing-room "devoted to mud, fish, birds, and vertebrates generally;" a donkey-engine for hauling in the sounding, dredging, and other lines, and a broad bridge amidships, from which the officer for the day gave the necessary orders for the performance of the many duties connected with their scientific labours. Thousands of fathoms of rope of all sizes, for dredging and sounding; tons of sounding weights, from half to a whole hundredweight apiece; dozens of thermometers for deep-sea temperatures, and gallons of methylated spirits for preserving the specimens obtained, were carried on board.

REVIEWS POSTPONED.—Two important works belonging to the library of Contemporary Science, published by Messrs. Chapman and Hall, the one on Anthropology and the other on Biology, we reserve for notice in our next.

FLOWERS.

Did I not cull thee, tender flowers!
'Mid the mountain valley gay,
As the fair white snow
Dipt into the glow
Of the moon's returning ray;
And bear thee, as the shades of night
Fell on the river's crystal light,
And shadowed my path the way?

Did I not nurse thee, tender flowers!
And nourish thee night and day,
That thy sisters fair
In the mountain air—
Tho' blooming—were scarce as gay?
Save when the early dews of dawn
Stole to the spot were thou wert born;
Where, cradled, the light winds play.

Now do I gaze on thee, tender flowers!
No longer in life; but where,
Some beauty hath given
A joy under Heaven,
'Tis aye to the heart as fair:
So, whenever I muse o'er thee, tender flowers!
I traverse the mountains, and valleys for hours,
And deem that we still are there!

HENRY GEORGE HELLON.

Geneva.

THE INVENTORS' DINNER.

ON Wednesday, the 28th of November, 1877, the dinner of members of the Inventors' Institute and other friends of the inventors' cause took place at St. James's Hall, Regent Street, London, W. It was (as in former years) well attended. The list of honorary stewards on this occasion contained the names of Sir Antonio Brady (President of the Inventors' Institute), His Grace the Duke of Manchester (Vice-President of the Inventors' Institute), Lord Richard Grosvenor, M.P. (Past President of the Inventors' Institute), Sir Thomas Fairbairn, Bart. (Vice-President of the Inventors' Institute), Sir D. Salomons, Bart., Sir Arthur Cotton, K.C.S.I., &c., Dr. J. D. Macdonald, R.N., F.R,S., &c., Newton Wilson, Esq., H. Roman, Esq., R. C. Rapier, Esq., C.E., S. Courtauld, Esq., F. W. Campin, Esq., F.R.S.L., Duncan McIver Campbell, Esq., H. G. Hellier, Esq., W. Dempsey, Esq., C.E., &c., J. S. Farmer, Esq., C.E., &c., A. Hildebrandt, Esq., C.E., M.I.M.E., M. Zingler, Esq., F. H. Varley, Esq., C.E., F.R.A.S. (Chairman of the Executive Council of the Inventors' Institute), T. Morgan, Esq., A.S.E., Henry Sharp, Esq., G. E. Pritchett, Esq., F.S.A., Thomas Blanchett, Esq., J. P. Cutts, Esq., J. E. K. Cutts, Esq., S. Calley, Esq., and T. Waller, Esq., C.E.

Sir Antonio Brady (President of the Inventors' Institute) took the chair. The dinner was of the recherché style, usual at St. James's Hall.

The CHAIRMAN, as the first toast, proposed "Her Majesty the Queen and the Royal Family," which was received with much loyalty. "The Legislature" was then toasted. "The Army, Navy, and Auxiliary Forces" was the next toast, and with this was coupled the names of Admiral Selwyn and Captain Fairholme, R.N.

Admiral SELWYN, in replying, remarked that although there could be no doubt that for the maintenance of our military and naval power we must, in the present day, look, not only to the gallantry and ability of those persons who belonged to the services, (on whom he would say they might rely with confidence), yet regard must also be had to the necessity of adopting every valuable improvement relating to warfare (cheers) and they might rest assured that nothing would prove a greater preservative of peace than being well prepared for war. Hence as an inventor, and one of the oldest members of the Inventors' Institute, he would observe that although inventors were indispensable to the advancement of the arts of peace, their labours were necessary to ensure success in war; consequently it was the highest duty of the State to foster invention, and encourage inventors. (Applause).

Captain FAIRHOLME, R.N., also returned thanks.

The CHAIRMAN then proposed "Success to the Inventors' Cause," and in doing so remarked that he felt that the cause of the inventor was at the present time in a more hopeful position than ever it had been before. Germany had just ceased to practise that policy of repression formerly adopted, and had enacted, and was now working out, a Patent Law which if not everything that could be desired, was nevertheless a distinct acknowledgment of the justice and propriety of the inventors' claims to property in his inventions. Moreover in this country we could cheer ourselves with the thought that the Bill introduced into Parliament by the Government during the last session, which was its third attempt at legislating, was, thanks to the action of the Inventors' Institute and other kindred bodies, a measure much more favourable to inventors than any that had preceded it, and he might safely assert that if one or two objectionable provisions in that Bill had been expunged, it would have afforded a very fair basis for the settlement of the question in a manner favourable to the inventor and advantageous to the public. So much success having been obtained, it might be fairly asserted that inventors would, by continuing their efforts, bring about a satisfactory solution of the whole question, and this view of the case was rendered the more probable as from all he had heard of the present Attorney-General he believed he was sincerely desirous of settling the question in a spirit of consideration for inventors as far as public interests would permit; for himself, he might say that he (Sir A. Brady) was always ready to work in the good cause—(cheers)—and he believed that with the blessing of Providence he should see that cause successful at no very distant date. He asked Dr. Siemens and Mr. F. W. Campin to respond to this toast. (Cheers.)

Dr. Siemens (who rose amidst much cheering) said that for himself he must acknowledge that he could not join in that wholesale condemnation of the British Patent Law that was so much in fashion. No doubt there were many points in which the law could be amended, but he did not consider that a system of regulating the granting of patents by preliminary examination would do any good, as an examiner who attempted to judge of the importance of inventions would be continually falling into the greatest mistakes, often throwing aside the greatest ideas, and as frequently accepting the merest trivialities—(Hear)—whilst discoveries which, if properly developed, would be of advantage to the whole human race, would be rejected and lost to the world. He hoped any Patent Law Bill hereafter proposed would be free from any objectionable provision as to examination.

Mr. Campin, in responding to the toast, remarked that after the very pertinent observations of the President and their respected and eminent Vice-President, Dr. Siemens, who was one of the oldest members of the Inventors' Institute, it would be unnecessary for him to occupy their time by making a long speech. He thoroughly endorsed all that had been said, and whilst tendering his thanks for his name having been coupled with this toast, would only add that the question of reduction in the cost of patents should be made a cardinal point in any legislative measure of amendment of the Patent Laws, for without such reduction no reform would be of any advantage to the great majority of inventors. (Loud cheers).

"The Inventors' Institute" being given as a toast,

Mr. Rapier, C.E., and Mr. Newton Wilson were called upon to respond. The first-named gentleman stated that the labours of inventors had within his experience changed the whole course of the profession of civil engineering, and

Mr. Newton Wilson observed that the monopoly—(cries of "It's no monopoly")—which was conferred on an inventor by the Patent Laws was not an objectionable one, as it produced results beneficial to industry and the public—(cheers)—but he for one thought that the Government had a perfect right to annex conditions to the grant, and that any equitable system of compulsory licenses would be no injury to inventors. (Cries of "No! no!") As one of the oldest members of the Inventors' Institute, he thanked them for coupling his name with this toast. (Applause).

"The Auditors of the Inventors' Institute" was then responded to by Mr. J. P. Cutts and Mr. W. Smartt.

The toast of the "Dinner Committee" was responded to by Mr. T. Morgan, Mr. Blanchett, and Mr. F. H. Varley, C.E. (Chairman of the Executive Council of the Inventors' Institute).

Mr. F. W. Campin then proposed Mr. J. E. K. Cutts, who would probably be known to many of them, as a director of the Inventors' Patentright Association, and he was glad of the occasion to propose this toast, as it would enable him to make a few remarks about the position of that body in regard to the Inventors' Institute, which was not in any way leagued with that Association, but was happy to assent to the offers it made of affording advantages to members of the institute in regard to procuring patents for them at reduced charges in an efficient way. He wished it, however, to be clearly understood that members were in no way bound to do business with that office. The members were perfectly free, for the institute was open to all inventors, and to patent agents, and everybody interested in inventions and patents. Mr. J. E. K. Cutts briefly responded to this toast.

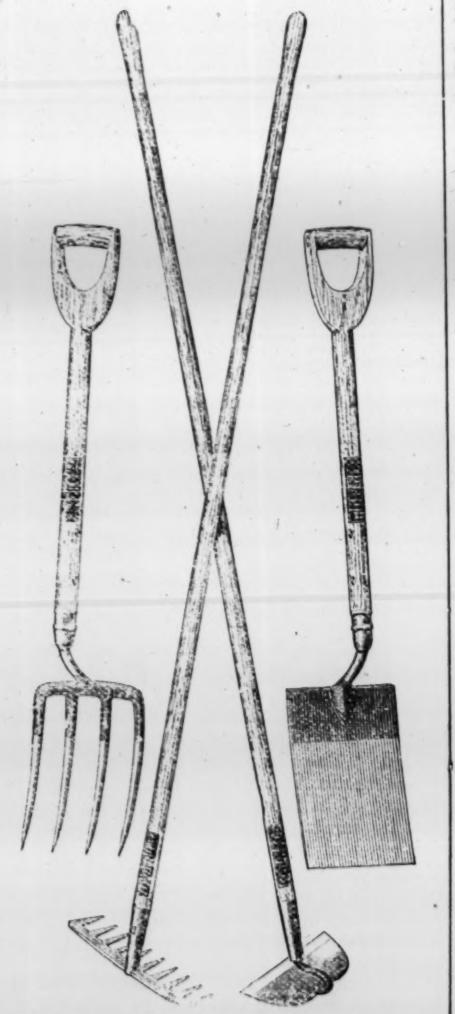
In reply to other toasts, Mr. Mottershead for the visitors, Mr. Whyle for the Press, and Mr. Campin as Secretary of the Inventors' Institute, returned thanks.

A vote of thanks to the chairman, Sir A. Brady, who had to leave the chair before the termination of the proceedings, was passed amidst loud and long-continued applause.

Admiral Selwyn, who took the chair vacated by Sir Antonio Brady, also received a vote of thanks passed by acclamation, and thus the proceedings terminated.

ANDREW'S PATENT PAXTON GARDEN AND AGRICULTURAL IMPLEMENTS.

By this invention the iron straps with which the hand in the ordinary tools continually comes in contact are abolished, and a smooth handle, better adapted and more suitable and agreeable to the hand when in use is substituted. It dispenses with the Cofer and Rivets on the face of the spade or shovel, and thus secures a smooth and level surface, which prevents all accumulation of earth. It works easier and keeps more cleanly.



The "Paxton" being divested of the iron Straps and Shaft at the N o the tool will penetrate the earth deeper and with greater ease, and there being no clogging of the earth at this essential part, accomplishes its work with greater facility and less labour. The implement is made out of one solid piece of cast steel and is altogether weldless. This important fact, combined with the efficient principle upon which it is made, imparts great strength and durability, and constitutes the great superiority and excellence of the "Paxton" implements. These implements are manufactured solely by Spear and Jackson, Ætna Works, Sheffield.

COFFERDAMS.

By Mr. William James Doherty, Assoc. Inst. C.E.

The cofferdam at Dublin (which with that at Birkenhead and that at Hull, form the subject matter of the following paper), designed by the author, consists of two rows of main piles of Memel timber, driven at intervals of 12 feet from centre to centre, with a space of 4 feet 6 inches between the rows for the puddle. The main piles in the outer row are 32 feet in length, and in the inner row from 40 to 42 feet. The spaces between the piles of both the outer and inner row are filled with sheet piles 6 inches thick. The sheet piles of the outer row were driven 12 feet into the ground, and, reaching up to the level of high water, are 28 feet long. Those in the inner row are of a similar length, driven to the level of the foundation of the new wall, 24 feet below low water. On the inner sides of the dam the faces of the sheet piles are in a line with the main piles. The piling, for a length of 150 feet, was driven during the winter, when clay could not be readily procured for puddle. The author therefore substituted peatmoss, which fairly answered the purpose. After the exclusion of the tidal water when the dam had been sufficienty strutted against the old wall, a row of piles 25 feet long being driven on the land side about 32 feet from the inner side of the dam, and spaced to correspond with the main piles. Between these inner piles 3-inch sheet piling was driven from the surface of the roadway to below the foundation of the old wall. In this piling there was a recess of 10 feet deep, and from 15 to 20 feet in length, in which pumps were erected. As the removal of the old wall was proceeded with, the stone of which it had been built was worked up in the new wall. When this masonry and the struts against it from the dam had been removed, whole-baulk struts, 30 feet long, were inserted between the land row of piles and the cofferdam. A row of close sheet piling, 24 to 26 feet long and 6 inches thick, was then driven along the land side to support the adjacent roadway; it answered also to receive the strutting of the dam. The strata through which the piles were driven consisted of 2 feet of soft mud, 4 feet of fine sand, 3 feet of vegetable deposit, overlying a bed of alluvial clay of from 4 feet to 11 feet, and a bed of gravel, interspersed with sand, boulders, and in some cases clay. On taking out the excavations for the first length of the wall, the bed of clay gave sufficient puddle for the next length of cofferdam, and so on to the end of the work. The use of peatmoss was therefore discontinued. The horizontal struts for supporting the cofferdam and the roadway were 6 feet apart, vertically, for the three upper tiers, but as the pressure increased the distance was diminished to 5 feet. The pressure appeared to reach its greatest intensity at 16 feet below low water. As it was found that the whole timber-wallings were in many instances broken, the distances between the main piles and struts were reduced from 12 feet to 10 feet from centre to centre. To prevent the wallings from being crushed at the point of contact with the struts, which were frequently indented to the extent of one and half-inch, facing-pieces were spiked against the wallings on the front and back, and against these facing-pieces the ends of the struts were butted. Even when the distances were reduced to 10 feet, these facing-pieces were splintered with the pressure, yet they preserved the wallings from injury. Although the greatest care was taken in driving the piles, and they presented a uniform surface for 4 or 5 feet after entering the ground, yet in most cases the points were separated from each other by intervals of from 4 to 6 inches. In consequence of the sand inside the dam lying immediately under the puddle, care had to be taken to prevent water from getting through it. The only "blows" that occurred, directly through the dam, were caused by water making its way at some of the open joints or where there was a broken pile, carrying in its course the sand, and leaving a space underneath the puddle, which then sank. So soon as a length of 200 lineal of feet of wall had been built, a cross-dam was constructed between the wall and cofferdam. The total length of river wall was 2,310 lineal feet, the contract price for which was £131,728, or £131,728, or £57 10s. per lineal foot, exclusive of the dredging of the foreshore. About 156,000 cubic feet of whole and half timbers, and 21,000 cubic feet of planking was used.

The cofferdam across the entrance to the Low-Water basin at Birkenhead was next described. It was on plan the segment of a circle, whose chord was 476 feet, and versed sine 76 feet. It was built in the year 1859-60 at a cost of £28,000, or £56 per lineal foot. An account of its destruction by the irruption of water had been previously given by Mr. J. Ellacott, M.Inst. C.E. (see Minutes of Proceedings, Inst. C.E., xxviii., p. 525).

The cofferdam across the Victoria Dock at Hull was one of a series designed to allow the trade of the dock to be carried on without interruption during the time an extension of 7 acres was added. The cost of the dam was £21 per linaal foot. —[Abridgement of Paper read at Institution of Civil Engineers.]

INDUSTRY AND ART IN LONDON.

(BY A CORRESPONDENT.)

METALS AND MACHINERY, PHOSPHOR BRONZE.—In the last impression of this journal an account was given of interesting facts about metals. From the great scope of the world of science some information crops up which may suit the pages of the SCIENTIFIC REVIEW on the metal of phosphor-bronze, which has been greatly experimented upon within the last few years, resulting in many high certificates as to its superiority in toughness and durability to gunmetal and brass, from the large capitals on the continent, as well as scientific and other trials at home. The 'Times' of the 20th ult., passes a high encomium on this metal in the Naval and Military Intelligence article. As it is becoming rather popular we may mention some facts on the authority of the Phosphor Bronze Company, Cannon-street, who have received flattering testimonials from the engineering papers, and whose books exhibit patronage by a large number of H.M. war steamers, and approvals from royal naval dockyards, foundries, and factories, and extensive railway, and engineering establishments. It is principally applied to machinery bearings of marine engines, and stationary machinery, hydraulic mills, worms, &c, for blast furnaces, and subsidiarily harness, and coach furniture, jewellery, plates for engraving, spurs and keys. Some of the latest approvals received by the Company report that eccentric straps wear one-sixth of an inch in eighteen months, where one of gun metal was worn out in three months. A plunger worked 1209 days at 110 hours per week, a steel one being useless in three weeks, at Barclay, Gray & Co.'s oil and rice mills; at the same mills crushing roll bearings, phosphor-bronze on one side and gun-metal on the other, at 120 revolutions in a minute, pressure two-and-half tons, working day and night. The effect was that whilst the gun metal bearings wore completely, the wear on the phosphor-bronze bearings was scarcely perceptible. Satisfactory results have been obtained in the case of large rolling mills and marine engine bearings. Many large steam ship companies, including the Hamburg Steam Navigation Company, are adopting phosphor-bronze for parts of engines, &c. The manufacturers of coal mining machinery speak highly of this metal.

METALS AND NEW WEDGE EXPANDER.—This implement has only been invented within year. It is called G. W. Elliott's Patent, and is designed to get down coal, stone, &c., in collieries, instead of powder. It is effectual in ripping down roof or getting up floor. It is of steel, and of almost unlimited expansion, The coal is brighter and more solid than after the shock of gunpowder. It is said to bring down once and a-half or twice as much coal or roof at one time as can be got by powder. All that is known with certainty respecting the theory of the wedge is that the mechanical power is increased by diminishing the angle of penetration. The patent wedge expander is based on tihs principle. The wedge consists of five several pieces, of which four, when placed together, form a cylinder filling the hole made for them in the mineral. The two middle pieces together constitute the penetrating wedge of which half is driven by hammer a little way before the other until the maximum expansion has been obtained. Should this, however, not be sufficient, a third wedge is driven between the other two middle ones, and this has always been sufficient to crack, dislocate, and bring down. Mr. Macdermott, Pudding-lane, E.C., is the part owner of this machine and sole agent.

ROCK-BLASTING.—The necessity for the operation of rock drilling, perforating, blasting, &c., has become very great compared to what it was some years since, owing to increased mining and railway opertions. An implement for that purpose, called "The Ingersoll," patented a few years ago in Anerica and England, has been treated of in some of the scientific papers. But its most recent public appearance has not reached them. A trial took place at Camborne in Cornwall about a fortnight ago. There were two others in competition, but the judges pronounced this the best. The committee of the Cornwall Mining Institute were the judges. The chief feature is the automatic feed dispensing with attendance, working a hole of 18 inches without attention. In Cornwall it worked 2 inches a minute through the hardest piece of a green stone boulder. It is being used for mining operations in Australia; it was first invented for the purpose of effecting the large excavations under New York. Though it has been described in other technical papers, the machine is worth reading about a second time. The principle of propelling the piston with steam or air power until it strikes the rock, is of great and decided advantage, resulting in quick penetration, while by means of the simple and strong valve arrangements one is enabled to form, a cushion, steam or air, at each end of the cylinder not only protecting the heads from injury, but preventing jar and vibration.

FOREIGN SCIENCE.

ACCORDING to 'les Debats' there will be a gyroscope at the Exhibition this year. It will be executed with new improvements so as to interest the mass of visitors. The clock weighing about 300 kilogrammes can oscillate at the end of an iron cord 65 to 70 metres in length. A special construction will be necessary to lodge the apparatus. Above the pendulum will be placed an immense terrestrial globe of 26 to 30 metres in diameter. This globe will necessarily follow the movements of the earth. The pendulum in oscillating will displace a sort of cornice which will remain like the pendulum itself fixed in space by relations with the heavenly constellations. This scientific marvel is designed to initiate the public in the solution of astronomical problems.

The inauguration of the bust of the great naturalist, Felix Fonchet, took place lately at Rouen. All the learned societies of the town were represented at that ceremony. Professor Bell's telephone has been considered a good deal lately on the continent. At Berlin, according to the 'Gazette' of Augsburg, experiences of telephony in German, French, and English, are always coining words in this century of grace. Under the director-general of posts and telegraphs, there have been satisfactory results. The Germans and Austrians have invented a word for the Telephone, namely, 'Fernsprecher,' speaker at distances.

Colonel Gonlier, member of the committee of mechanical arts, presents to the French Science Advancement Society, a clear Wollaston chamber, which parent successor to Baraban was constructed under his directions in which the 'arrears de disposition' found since 1838 in France in most of these instruments are rectified. A new invention is mentioned—that of M. Folacci, for transport. It is a waggon constructed to facilitate discharge of large blocks of stone. M. Folacci, according to 'Les Mondes' has made this process easy and inexpensive. The stone is received on a moveable plank reposing on the platform of the waggon provided with shuffle boards with an inclination of 5 per cent. which permits the gliding of the moveable part when a pin placed in front is taken away which was maintained in its place during transport. A rather remarkable work has just appeared in Paris, 'La Genese des Societes modernes" —the Genesis of Modern Society, dedicated to men of science by J. P. Mayavoz, published by Levy. It is very well written and enters on the field of Mr. Darwin at times, and creates some sensation. The author says he has dedicated it to men of science, because they prepare in advance all the changes in the life of people. Men of science have in reality the power of averting the terrible catastrophes of the future by counselling populations and powers upon putting in practice economical reforms urgently claimed by the wants of our century.

A very valuable work was published in 1873 under the auspices of the Government called the Empire of Brazil, at the Vienna Exhibition. From it we find that all inventors have the ownership of their inventions. The law affords them an exclusive temporary privilege (patent); or else they are indemnified of the prejudice accruing from the publication of their secret. No kind of labour, industry, or trade can be prohibited—unless an outrage of "bonas mores." There are a number of literary and industrial associations in Brazil: amongst them is the Association for Instruction of Workmen, which is in a suburb of Rio Janeiro, and is much frequented and maintains evening classes.

RECENT AMERICAN AND FOREIGN PATENTS.

Purifying Raw Animal Fat.—Isaac Mayer, New York. The object of this invention is to furnish a superior machine tallow, by a quick, cheap, and convenient process, from raw animal fat without the use of special machinery: and it consists of treating the raw fat with diluted nitric acid, then boiling the fat and finally separating the tallow from the heavier fibres by cooling. The raw animal fat is first cut up in small slices or blocks of about one inch in size, and then treated in a wooden vessel with diluted nitric acid of about 2 degrees Baume. The acid has to cover entirely the fat, and is allowed to remain in the vessel for from thirty to forty-eight hours or more the liquid being then poured off, and the so-prepared fat exposed to boiling in an iron vessel for from fifteen to thirty minutes, the fat being stirred up from time to time, to prevent the burning of the fibrous and tendonous parts. The fat is then removed and allowed to cool under addition of water the fibrous parts settling on the bottom of the cooling vessel, while the tallow is obtained at the top, and readily drawn off or removed. The fibrous sediments form a valuable food for pigs, while the tallow is of a clear and superior nature, and obtained in a cheap and convenient manner, without the use of expensive presses, &c. and without producing any obnoxious odours.

Coffee Roaster.—John Bankston, Pulaski, Tenn., assignor to himself and T. J. Wells, of same place. This invention relates to an improved device for roasting coffee, baking bread, meat, cakes, and other articles in perfect manner by the radiated heat of an open fireplace, so as to utilise the heat in convenient and economical manner; and the invention consists of a conical reflector with fixed cap or apex, being supported in suitable manner, with the open base or mouth toward the fire, and provided with flanges and supports for the baking pans, roasting cylinder, &c. The device is used by placieng either the roasting cylinder or baking pan in position in the reflector, and then placing the reflector before the fire. The roasting cylinder is then slowly turned by the crank or handle of the cylinder shaft, the roasting being accomplished by the heat of the radiated and reflected rays of the open fire. The bread, cakea, meat, &c., are baked in the same manner by placing the mouth of the reflector at proper distance from the fire, the same being readily moved by a top handle.

Mainspring Attachment For Watch Barrels.—Edwin Flint, Cincinnati. The winding of the watch is effected by turning the arbour, which carries the outer end of the spring around, and coils the inner end of the spring around the boss of the barrel wheel. The advantages claimed for this improved watch are that it is perfectly dust proof, it does away with the usual retaining mechanism, and obviates injury to the watch in case the spring breaks.

Smoke Excluding Mask.—Geo. Neally, New York, assignor to himself and Charles Bloomingdale, of same place. A great many persons perish by being suffocated by the smoke and gases in attempting to escape from burning buildings, while also a large quantity of valuable property is destroyed by the inability of the firemen to determine the location of a fire on account of the smoke, so that it gains such headway that it is impossible to check it before a great deal of damage has been occasioned by throwing the water in localities where the fire does not really exist. The invention consists of a novel combined mask and cap, of suitable elastic material, that fits tightly to the head and whose mouth and nose are connected by a mouthpiece, and one or more tubes with suitable filters containing moistening sponge which filters are again connected by one or more tubes, with an elastic water receptacle strapped around the neck or body, so as to resupply from time to time the filters with the required degree of moisture by a slight pressure on the receptacle.

A curious and novel device is a new system of buoyant propeller wheels for vessels invented by Mr. Laurence Brown, of Chatham, New Brunswick. A number of air-tight polygonal drums are arranged to turn in bearings on a supporting frame, upon which frame the saloons, &c., are erected. By suitable machinery these drums are revolved, and cause the propulsion of the entire structure, on the principle of an air-tight float or box, which, when upset or turned, will change position, and move over to the side towards which it falls.

Mr. Ezekiel Delano, of Greenwich, Connecticut, has devised a new addressing machine, wherein devices are embodied for addressing papers and packages rapidly without the sticking of the label strip so as to clog the machine, and also for removing the papers or wrappers. The construction is very ingenious, and well calculated to save time and labour.

Mr. Henry Rodgers, of New York city, is the inventor of the latest machine for making car conductors honest. It is a fare register, shaped something like a large watch, and containing a bell and a moving strip of paper, which last passes from one spool upon another. On the paper are marked numbers indicating the number of fares received, each number being greater than that preceding by the sum of one fare. When the conductor pushes down a follower, the bell is sounded, and the paper moved to the second spool. At the same time one of the numbers marked on it is perforated by a needle. The last number found punctured represents the total of fares taken. The device is of exceptional ingenuity, and is well calculated to chech the thieving proclivities of even the most conscienceless of conductors.

Mr. Philip Leitz, of Baton Rouge, La., has patented a machine for cutting sugar cane, or corn, cotton stalks, and stubble. As the apparatus is drawn forward, upper knives first meet the cane and cut off the tops, and then a lower set of knives cut off the bottoms. These knives may be adjusted to work higher or lower, with reference to the ground. The new features consist mainly in the mechanical construction.

A novel ditching machine, devised by Mr. Peter N. Fowler, of Smith's Mills, Kentucky, embodies seven new devices. In rear of the machine is a large wheel having a wide smooth-faced rim. Around this passes an endless chain of buckets formed of sharp-edged steel bars. As these begin to rise at the lower side of the wheel, the soil within them is separated from the ground by the edge of the plate, which retains the material in the buckets as they pass upward.

Mr. John J. Smith, of Unionville, Mo., has patented a new sulky harrow, which adapts itself to the surface of the ground, however uneven said surface may be. Its parts may be separately or simultaneously raised from the ground in passing from place to place, or to clear obstructions.

A new grain separator for thrashing machines, invented by Mr. James Shepler, has an improved straw carrier by which all the grain that passes over or through the separator is saved and returned to the grain elevator of the thrasher. Another device prevents the choking of the riddle, and keeps the same perfectly clean around and below the stacker.

Mr. John Porter, of Booneville, Miss., has patented a new fastener for colters and plough standards. It may be applied to any kind of a plough, is not liable to break or get out of order, and holds the colter or standard firmly in place. The colter may be raised or lowered as desired.

Mr. Royal W. Barnard, of Fayette, Iowa, has devised a new butter worker. It is made in the shape of a foot, one portion of which is made flat for packing, and the other portion has flanged edges to scrape down the butter from the sides of the tank, and also to prevent the grinding of the grain of the butter by not permitting washing or rubbing of the same.

Messrs. Nimrod Gooder and Bernard Lavin of Kansasville, Wisconsin, have devised an improved machine for punching and shearing, which enables cold punching, shearing, and similar work to be conveniently and efficiently performed. The new feature resides in the combination of a vertically-guided and interchangeable tool with a pivoted actuating cam lever, and interchangeable equalizing plate acting on the top of the tool, and with a pivoted spring engaging the lower part of the tool. By retracting the spring the tool may be easily changed.

An improved rock drill has been invented by Mr. Gaines, of AuSable Forks, New York. Ordinarily the serpentine groove which gives motion to the slide valve in these machines is formed of a single segment of a cylinder made of hardened steel. In the present instance it is made of two separate pieces of metal. This is claimed to obviate the danger of the segments cracking, and admits of their easy removal from the piston head when they wear out.

A new car coupling, devised by Mr. Christmas Byrd, of North Cambridge, Massachusetts, has a releasing lever which extends down to the drawhead and throws back, by the concussion of the latter, trigger mechanism so as to release a sliding pin and drop the coupling pin into the drawhead and link for coupling. The coupling link is held in the required position for entering the opposite drawhead by a crank screw and head adjusted from below the drawhead.

A new sun dial, patented by Mr. Axel W. Anderson, Bedford, Pa., consists of a ring having circumferential slots, surrounded by a perforated adjustable band, and containing an adjustable dial or scale, formed in an epicycloidal curve. A pencil of light falls upon hour marks engraved on the device, through an aperture in the band. This invention is both curious and ingenious, and as the inventor states it may be made small enough to serve as a charm for a watch chain, it doubtless would be a profitable article to manufacture.

A new breech-loading firearm, patented by Mr. Victor Bory, of New York city, is an improvement on the arm patented by the same inventor June 5, 1877. The constuction is materrially simplified, and new devices for hinging the barrel to the breech-piece, working the extractor, &c., are added.

A new rock drill has been patented by Mr. Uriah Cummings, of Buffalo, N.Y. The novelty consists in constructing the clutch head with ratchet teeth on its upper end, in combination with a pawl, which is so arranged on the frame of the machine that the drill rod will receive intermittent rotary movement during its ascending strokes.

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SESSION 1877—1878.

MEMBERS' MEETING.

At a Quarter-past Eight in the Evening,

Thursday, January 10th. Patent Law Conference.

Thursday, January 24th. "On some Improvements applicable to the Permanent Way of Railways," and Patent Law Conference if time permit. The Executive Council meet at 7.30 p.m. on same days.

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F. W. CAMPIN, Sec.

Proceedings of the Institute.

MEMBERS' MEETING.

On December 13th, G. G. Laurence, Esq., read his paper "On Arrangements for Lowering Boats from Ships for Saving Life at Sea. Sir Antonio Brady, President of the Institute, was in the chair. In this paper Mr. Laurence described his invention for boat lowering, as being one that would allow of the boat being lowered and released in a ready, expeditious, and safe manner. Like the invention of Messrs. Share and Calley (which was described in the paper read before the Institute by Mr. S. Calley sometime ago and fully reported in this journal) the boat was shown to be slung ready for use by being suspended at each end, and jaws or catches of automatic action were adopted; but various practical arrangements considered to be of much importance were also adopted.

In the discussion on this paper the President, Captain Fairholme, R.N., Messrs. Somerset, Mackenzie, Hill, Blanchett, and others took part. It was urged by Mr. Hill that the suspension of a boat by securing it at its two ends was objectionable; for like a stick it would be liable to break in the middle when weighted by being filled with people. Mr. Somerset Mackenzie, Mr. Laurence and other speakers controverted this view of the matter, affirming that a good boat should in reality be more like a girder than a stick and that it could not be considered improper for the suspension points of a girder to be at its two ends. The general idea seemed to be that the invention was a promising one. Votes of thanks to the reader of the paper and the chairman terminated the proceedings.

EXECUTIVE COUNCIL.

Preceding the Members' Meeting on the 13th ult. the Executive Council met, and after passing the Minutes of last meeting, the position of the Patent question was considered, and it was agreed hat Patent Conferences should be held during January, 1878.

Monthly Notices.

The Academie des Sciences of Paris has elected Sir William Thomson to fill the place of the late Von Baer as Foreign Associate.

Professor Alleyne Nicholson, of St. Audrews, has been appointed by the Trustees of the British Museum, to deliver the Swiney Lectures on Geology this year.

M. Trouve communicates to the Académie des Sciences of Paris a modified form of Prof. Bell's telephone, which gives more decided effects. He substituies for the single vibrating disc of Bell's telephone a cubic chamber, of which each surface save one is formed of a vibrating plate. Each of these, thrown into vibration, acts upon a fixed magnet fitted with an electric circle. The intensity of sound increases in proportion to the number of magnets employed, and can, therefore, be carried to a much greater distance.—*Athenæum.*

Cooking by solar rays is said to have been tried successfully at Bombay. A tinned copper vessel, with a glass cover, and a polished reflector, was all the apparatus required. We remember that, when Sir John Herschel was at the Cape of Good Hope, his luncheon chop was sometimes cooked for him by the heat of the sun with similar apparatus.

The Liquifying of Bioxyde d'Azote and nitric acid by M. Cailletet, has been reported to the Académie des Sciences. This is one of the six gases reputed to be permanently gaseous.

The Quickest Passage on record between England and Australia.—The fastest passage on record from London to Melbourne has been made by the "Lusitania," of the Orient line. She arrived on the 8th of November, bringing English papers of three weeks' later date than those of the previous mail. The voyage has been performed in 40 days 6½ hours, inclusive of a detention of one day and seven hours at St. Vincent, where a call was made for coal, and the total time the steamer was under way was 38 days 23 hours and 40 minutes. Some very fast steaming was done, and the average speed per day was 311½ miles, the last day's work being 144 miles. The Lusitania brought out 345 passengers, 68 of these being in the saloon. This quick passage of the Lusitania has excited much attention, showing, as it has done, that in the matter of steam communication, via the Cape the colony may be better served by competition than by the subsidy of any particular line. The Lusitania goes home by the Suez Canal, which route has also been chosen for the homeward road of the Whampoa. It is interesting to note that, although the August mail was delivered in Melbourne a week before contract time, the time occupied between London and Melbourne was only one day less than the direct voyage of the Lusitania.

French Opinion of Glycerine in Disease.—The "Journal of Chemistry" summarizes M. Cattillon's paper on glycerine in therapeutics, read before one of the medical societies of Paris, giving the opinion of eminent professional authorities as to the value of glycerine in therapeutics. It appears from this that Dr. Lauder Lindsay believes the article to have soothing emollient, and even antiseptic properties and a very marked action on assimilation, nutrition, and development. Dr. Davisse also bears testimony to its regenerating action on the digestive functions. Dr. Daude has made use of it in the treatment of dysentery with very favorable results. Dr. Pavy and many other physicians have employed it to overcome the disgust for food experienced by diabetic patients deprived of sugar, and to facilitate disgestion. Prof. Fubler has administered it in acne with excellent results; at the same time he noted that the action of the bowels which had been unfrequent and difficult previously, became regular under this treatment, but without diarrhœa. Demarquay thinks that glycerine would have good effect on intestinal derangements.

A Smoker's Penknife, having a piecer and holding-fork shutting up in the same handle, is among the *minora technica* of the day. It is issued by Messrs. Butler, of Sheffield.

Night and Day.—This monthly journal of information as to the important works of social amelioration now being carried on under the direction of Dr. Barnardo, still maintains its character as an interesting record of practical philanthrophy.

SANITAS.

Doubtless many of our readers have seen the word "Sanitas" placarded on the walls and iterated in the advertising columns of the periodical press. Now, the meaning of this term as applied to a commercial product has been the subject of much questioning. Some persons have asked, "Is it good to eat?" Others have thought it to be an addition to our list of popular remedies usual termed patent medicines. Both of the above suppositions are, however, wide of the mark; Sanitas is not an eatable, though it is in a certain sense a drinkable, and it is not a medicine, although it is an important addition to our aids for preserving and restoring health, being, in point of fact, a liquid which is a true disinfectant and deodoriser; one that does not substitute one stink for another as many disinfectants do, but purifies the air in an efficient and natural way. It will, probably, render the matter more readily understandable if we quote from a brief statement of the history and nature of the invention published by the Sanitas Company.

It appears that Mr. C. T. Kingzett, the eminent chemist, engaged himself in a prolonged inquiry into the nature and influence of ozone. Since Dr. Davy's observations, the belief had grown and become intensified, that ozone as it exists in the air constitutes the great purifying influence in nature. Attempts were made to establish a relation between certain diseases and the absence of ozone from the atmosphere. Freedom from various germ-diseases had been considered to stand in a sort of proportion to the amount of ozone present in the air at certain times. Men talked glibly of ozone. It had one great advantage over the majority of scientific expressions. It was short. It presented no quantatitive difficulties. Very few people outside of the scientific world knew precisely what it meant, and it was found convenient to ascribe to it all kinds of qualities. The health-restoring property of sea-air was derived from ozone. One heard even of ozone baths. As time rolled on, it came to be believed that plants exposed to the air evolved this precious gas by the process known as slow oxidation, while flowers did not. But it must be confessed that the real proof of the production of this active principle was not forthcoming, for the methods of identification did not distinguish between ozone and a kindred substance, peroxide of hydrogen. Mr. Kingzett was inclined to believe that plants do not produce ozone, but peroxide of hydrogen, and undertook a series of experiments to clear up this moot point in natural chemistry. He accordingly submitted to the influence of atmospheric air and oxygen a large number of oils and other bodies, such as turpentine, caraway, bergamot, eucalyptus and juniper. He found that oxygen was absorbed rapidly by all these substances, and in the case of turpentine to an enormous extent. It must be recollected that these oils do not absorb oxygen in the sense that water dissolves sugar, as the gas enters into combination with them and forms new substances. Recognising that of all the substances tested, turpentine possessed in the highest degree the faculty of absorbing oxygen, Mr. Kingzett next found that when turpentine was exposed to a current of air in the presence of water, and especially at summer temperatures, oxygen was absorbed, part of the oil was resinfied, and the rest oxidized into a compound unstable in the presence of water, and splitting up thereby into the precious peroxide of hydrogen and camphoric acid. The result of these experiments was to convince the investigator, firstly, that the hygienic principle common to groves of pine trees (notable instances of which are those of Bournemouth and Arcachon), and blue gum trees ("Eucalyptus globulus"), so well known in Australia, was the constant evolution of peroxide of hydrogen and camphoric acid, caused by the volatilization of naturally secreted oils; and secondly, that this by no means depended upon the odour of either, but upon the "terpene" or principle of turpentine common to all, and most powerful in the ordinary turpentine of commerce, derived from the pine.

Having then arrived at the facts that the healthy atmosphere of pine wood or a eucalyptus grove is due to the presence of peroxide of hydrogen and camphoraceous substances produced by the resinous oils secreted by those trees, and that these valuable natural purifiers can be produced from common turpentine, Mr. Kingzett set to work to manufacture them in such quantities as would make them practically available as antiseptics and disinfectants, in short, to imitate at will the effect produced on an immense scale in Nature's own laboratory. It is not pretended that Mr. Kingzett was the first to discover the disinfectant properties of peroxide of hydrogen, as these have long been known to chemists, but its mode of preparation has, in the past, been so expensive that it could not be used for sanitary purposes. His discovery is limited to the indentification of its purifying power with that of the pine and eucalyptus, and the invention of a method of preparation which brings it within the reach of the public.

To effect the latter purpose, he undertook, in conjunction with his friend Mr. Zingler, a series of experiments. He commenced by exposing a large quantity of turpentine floating on water to a hot-blast, much the same as molten iron is in the Bessemer "converter," with the effect of producing a watery solution, composed of peroxide of hydrogen, camphoric peroxide, camphoric acid, and camphor, the identical product to which the name of "SANITAS" has been given, and which is thus both a powerful disinfectant power to the peroxide of hydrogen, and its preservative power to the camphoric acid and other ingredients. By dint of gradual improvement great perfection has been attained in making "Sanitas." As now practised at the "Sanitas' Company's works, at Letchford's-buildings, Three Colt-lane, Bethnal Green, the process is curious and interesting, and has the advantage of being easily followed; steam, water, and turpentine being the substances employed. Ranged along the wall are the barrels of turpentine, the active principles of which are to be converted into "Sanitas." On the opposite side is is a row of vats, containing hot water, into each of which is plunged a huge earthern vessel, specially manufactured for the purpose by Doulton and Watts, and capable of holding about a hundred gallons. In the upper part of these immense carboys are three apertures; one for air, one for water, and the third for carrying off the species of "air-gas" as it is called, generated in the process of manufacture. Through the water-tube is poured a stream of water heated to 160° Fahr. until each of the great earthenware jars has received about ninety gallons. Then turpentine is poured in. This of course floats on the surface of the water and is allowed to form an upper stratum or skin, six inches thick. Through this floating mass of turpentine a tube descends to its point of junction with the water, and it is through this tube that a blast of hot air is forced by a blowing engine driven by steam. It is hardly necessary to repeat that atmospheric air is largely composed of oxygen. The effect of the blast of hot air is to oxide (otherwise burn) the mass of turpentine which throws down certain of its constituent bodies in combination with oxygen into the water. By continuing the blast for a long time the sheet of turpentine may be completely decomposed; the valuable disinfectaat and antiseptic principles being thrown down into the water, and a considerable proportion passing off through the third or escape pipe as inflammable gas, only the more solid resinous portions being inconvertible. The air which in passing through the turpentine has yielded up a large part of its oxygen, has also taken up a quantity of turpentine, and for economical purposes its turpentine must be condensed and made available for further use. This is very ingeniously effected by a condensing and filtering apparatus, so perfect that every particle of turpentine is recovered. The watery residuum in the great jars or carboys is the fluid called "Sanitas," the composition of which has been already described. It is allowed to cool and settle, and beyond filtering requires no further preparation for its manifold uses. That these are numerous must be obvious when it is recollected that it has the double power of disinfecting the products generated by fermentation and decomposition when they have already commenced, and, if applied in time, of preventing those natural processes.

From what has been said it will be evident that the invention of "Sanitas"—the only true antiseptic and disinfectant combined—is the result of a close study of the chemistry of nature and the application of her method to the artificial production of a material capable of imitating her hygienic work with the greatest exactitude.

"Sanitas" fills an important gap in the long array of antiseptics and disinfeutants. One of the most popular of these as an efficient disinfectant cannot, on account of its intense colour, be sprinkled on bedclothes and furniture, as it would destroy them. Another has a disgusting odour and is poisonous. A third destroys goods and clothing, and is poisonous. A third destroys goods and clothing, and is also poisonous. "Sanitas" has none of these disagreeable properties, and leaves no trace after the perfect evaporation which cannot fail to take place. It may be thrown over bed-clothing, furniture, and carpets with perfect safety, and, from its non-poisonous quality, may be used with equal impunity in preserving edibles from corruption. As a true antiseptic it prevents, according to the testimony of Dr. Arthur Hill Hassall, "the putrefaction and acetification of beer, wines, milk &c., and at the same time it is disinfectant in the proper sense of the word, destroying any vegetable or animal organisms with which it comes in contact. Mr. Lennox Browne also bears witness to the excellence of "Sanitas," as a therapeutic agent in that class of dissase which comes under his immediate notice. In various forms of sore throat he has found it "of the greatest service as an antiseptic and disinfectant, whether used as a gargle or with the douche," and has, moreover, found it completely successful in eradicating the smell of paint from a room. Dr. Hake certifies the use of "Sanitus" in "cold sponging the skin in fever," and adds that "it may, thus used, have the effect of destroying infectious matter evolved from the surface, and thus prevent the spread of disease." Mr. James Williamson also acknowledges the use of "Sanitas" in cases of scarlet fever, in facilitating the isolation of the disease. During an attack of scarlet fever in his family he hung cloths saturated with "Sanitas" outside and inside the door of the patient's room, and the remainder of his children escaped any symptom of fever. Since this experience "Sanitas" has been tried in a number of instances with excellent effect both for cold-sponging and disinfection in cases of fever. In Switzerland it has obtained wide recognition, its excellence having been certified by Prof. Vuillet, and Drs. Colladon, Julliard and Spiess of Geneva, Drs. D ipoat and De Dereuville of Lausanne, Dr. De Montet of Vevay, Prof. Korner of Berne, Billeter of Neuchatel, Vœlkel of Soleure, Pinard and Socin of Bale. Dr. F. Weber, of London, has also testified to the merits of "Sanitas." Apart from its value in the hospital as a disinfectant, and in the ordinary operations of surgery as an antiseptic "Sanitas" is susceptible of a variety of applications to the purposes of every day life. Diluted with ten times its quantity of water it will keep pure the air of barracks, workshops, school-rooms, and ordinary rooms, and is of the greatest use in disinfecting cellars, kennels, cattle-sheds, slaughter-houses, butchers' shops, dairies, sculleries, and other offices of the household. Its efficacy in this respect has been demonstrated in the most satisfactory manner. At the Dairy Show, recently held at the Agricultural Hall, Islington, when the exhalations of goats, mules and other animals mingled with the odour of cheese and other dairy produce, the air was kept perfectly sweet and pure by the employment of "Sanitas." It will purify the holds of ships, will sweeten musty barrels, wine and beer bottles, and tubs. It is also useful in the garden for destroying blight, and on shipboard for destroying the detestable odour of bilge-water. "Sanitas," moreover, is a valuable preservative of food. Meat, fish, fruits, preserves, and all solid foods may be preserved by immersing them in "Sanitas," or wrapping them in cloths moistened with it. To small householders keeping their own barrel of beer "Sanitas" is very useful. Treated with two ounces of "Santas" to the barrel of nine gallons, light ale for family drinking is kept free from acidity, secondary fermentation and fungus. Milk also may be kept sweet and fresh in the hottest weather by the addition of "Sanitas" in the proportion of one pint to the hundred gallons.

In addition to these economic and hygienic uses "Sanitas" is an article of luxury. A teaspoonful added to the water in which the mouth is washed completely removes the odour of tobacco, and it may be applied to all the purposes of toilet vinegars. Aromatic "Sanitas" mingled with water in the proportion of one pint to ten gallons of water produces a bath of which the Poppæan bath of asses' milk, the wine-baths of the queen of opera bouffe, the rum baths of West Indian planters, the "eau de Cologne" bath of the Russian dandy, and those baths of Schlangenbad, in which "on devient amoureux de soi-même" are but feeble and ineffectual representatives.

A NEW DYESTUFF FROM ANTHRACENE.

A MIXTURE of glycerin and concentrated sulphuric acid reacts upon the dyestuffs derived from anthracene and produces new compounds, which likewise possess colouring properties. As yet only alizarine and mono-nitro-alizarine have been tested in this respect. By heating a mixture of 1 part of alizarine paste, 2 parts of white glycerin, and 2 parts sulphuric acid of 66 deg. B., the liquid becomes rapidly dark brown, and a large quantity of gas is evolved containing sulphurous acid and acroleine. The temperature is kept for some time at 200 deg. C. (392 deg. Fah.), in order to accomplish a perfect conversion of all the alizarine. It is then allowed to cool, the product poured in a large quantity of water and filtered. The dark yellow insoluble residue is washed several times with hot water, then taken up cold by a mixture of equal parts alcohol and water, in which the new dyestuffs dissolve. The shades of red and pink which they yield in dyeing are more yellowish than those of alizarine, the violets are more bluish, and the browns more reddish, while the blacks are also finer than with alizarine. With ammonia and carbonate of soda it yields an orange red solution, while alizarine with alkali dyes purple. If alcohol is added to these solutions they become dicroitic; namely, in transmitted light red and by reflected light green. It reacts toward alum the same as alizarine, and also resembles it in its other physical properties, such as its reactiod toward soap, acid liquids, chlorine, &c. With like treatment the mono-nitro-alizarine produces peculiar results. On treating the washing water with caustic soda, a dark indigo blue precipitate is thrown down, which is reduced by tin salt and caustic soda solution to a pink liquid, which becomes covered with a greenish blue lustre. The precipitate collected upon the filter consists of two different substances, which may be easily separated by a cold mixture of alcohol and water. The substance, easily soluble in this, dyes violet with alum mordants, bluish-black with strong iron mordant and a mixture of iron and alumina, and bluish grey with weak iron mordant. The other and less soluble substance dyes quite a fine black, a grey violet, and instead of red a pink, and for brown a catechu brown without any red admixture. Both dyes resist soap well, chlorine not so well, and are destroyed by strong acids.

Dyestuffs of the anthracene series are known already which produce a violet with alum mordant. One of these is obtained by the action of ammonia upon anthrapurpurine in closed vessels, and has been found by Perkin in crude alizarine. It seems to be identical with the purpuramid of Stenhouse. The other was put into the market about a year ago by Gauhe and Co., of Barmen, under the name of "anthraviolet," but possesses no special interest from an industrial point of view. According to N. Potier's investigations (Soc. Ind. de Rouen, September and October, 1876), this anthraviolet dyes uneven and with difficulty, and the colours produced do not withstand either soap and chlorine.

A dyestuff which yields a series of colours similar to those given by Campeachy wood, and which can replace them, specially by the very fugitive steam dyes, would be of special interest. Both of the dyes obtained from nitro-alizarine by the author seem to satisfy these conditions. As regards the constitution of these substances, the author thinks that in their production the molecule of glycerin takes part in the reaction, and therefore they may perhaps be regarded as glycerides. He reserves to himself the right to subject the other drystuffs of the anthracene series, such as purpurine, isopurpurine, &c., as well as the non-dyeing members of the series, anthrachinone and nitro-anthrachinone, to the same treatment.

A NEW SOCIETY.—THE PERSONAL RIGHTS AND SELF-HELP ASSOCIATION.

1. To protect and enlarge personal liberty and personal rights. 2. To oppose the multiplication of laws and the tendency to control and direct through Parliament the affairs of the people are the objects of this Society. The Hon. Auberon Herbert, is Hon. Sec. pro tem. and A. Hill, Treasurer.

It is stated in the address just issued that it is desired by this Association to hold a series of monthly public meetings for the purpose of discussing whether Government interference in industrial, social, and religious matters, is to the real advantage of the people or not. The address continues: As an Association we are strongly convinced that past experience shows that whatever momentary advantages may be gained by such interference, the ultimate result is loss, especially as regards the character of the people concerned; but we are aware how much discussion is required upon all these subjects and we only desire to see our views extended after they have been submitted to the most searching criticism. Whilst we believe in the general principle of liberty as against restraint or protection, and always claim a strong presumption in its favour, we are prepared to discuss each individual case on its own merits, and with regard to its own special effects. We therefore wish that these discussions should be of a strictly impartial character. We wish to bring together speakers equally representing the opinion in favour of and the opinion opposed to Goverement interference. If our views are true, we know that it is in this way that they will gradually gain influence; if they are not true, we are content that such should be shown to be the case as speedily and as effectually as possible. Our cause is one which essentially relies on free discussion, and we appeal to the public, both to those with whom we agree, and with whom we differ, to assist us in trying to obtain a thorough examination of what are the results of Government interference in the great matters of social life.

In entering upon these discussions, there is one point which should be remembered. The most important effects of any action are often not the most apparent, and not those which result at the moment. We have yet much to learn in tracing the subtle relations of causes and effect in social and political life. This science is still new and unfamiliar to us, and it is on account of the slight study that has hitherto been paid to it, that, as we believe, legislation has been so rashly employed in the past, and has resulted in so many disappointments.

A new butter mould has been devised by Mr. Augustus W. Faris, of Red Sulphur Springs, West Va., which presses out the milk and water from the butter, and forms it into neat packages of uniform size, so that it can readily be stowed in boxes for transportation, and for the retailer.

Proceedings of Societies.

ROYAL SOCIETY.

Nov. 22nd.—Sir. J. Hooker, President in the chair.—The following paper was read: 'Remarks on the Attributes of the Germinal Particles of Bacteria, in reply to Dr. Tyndall,' by Dr. Burdon Sanderson.

Nov. 30th. Anniversary Meeting. The President, Sir J. Hooker, delivered the annual address and presented the medals, after which the following were elected as council and officers for the ensuing year. President, Sir J. D. Hooker; Treasurer, W. Spottiswoode, Esq.; Secretaries, Prof. G. G. Stokes and Prof. T. H. Huxley; Foreign Secretary, Prof. A. W. Williamson; other Members of the Council, F. A. Abel, W. Bowman, F. J. Bramwell, W. B. Carpenter, W. Carruthers, W. Crookes, Prof. P. M. Duncan, W. Farr, Prof. W. H. Flower, Prof. G. C. Foster, J. R. Hind, Lord Rayleigh, Vice-Admiral Sir G. H. Richards, Prof. H. J. S. Smith Professor Balfour Stewart, and Professor A. Thomson.

Dec. 6th.—Sir J. Hooker, President, in the chair. The following papers were read: 'On the Tides at Malta,' by Sir G. Airy; 'Observations on hermetically sealed Flasks opened in the Alps, in a letter to Professor Huxley,' by Dr. Tyndall; Researches on the Effect of Light upon Bacteria and other Organisms,' by Dr. A. Downes and Mr. T. P. Blunt; and 'On Points of Resemblance between the Supra-renal Bodies of the Horse and Dog, and certain occasional Structures in the Ovary,' by Dr. Creighton.

Dec. 13th.—Sir J. Hooker, President, in the chair. Seven Foreign Members were elected, viz., M. Berthelot, of Paris; J. Decaisne, of Paris; E. Reymond, of Berlin; A. W. Kolbe, of Leipzig; R. Leuckart, of Leipzig; S. Newcomb, of Washington; and Pafnutij Tschebytschew, of St. Petersburg. The following papers were read: 'On Electrostriction,' by Prof. E. Mills; 'On the Examination of Air,' by Dr. A. Smith; 'On a Cause for the Appearance of Bright Lines in the Spectra of Irresolvable Star Clusters,' by J. Stone; and 'Experimental Researches on the Electric Discharge with the Chloride of Silver Battery,' by Messrs. W. De La Rue and H. Muller.

ROYAL SOCIETY OF LITERATURE.

Nov. 28th.—Sir P. de Colquhoun in the chair. Mr. Vaux read a paper 'On Wax Tablets recently found at Pompeii,' in which he gave a general account of the use of these 'ceratæ tabulæ,' which, though not confined to the Romans, were in so much greater use among that people than among any other that they have been very generally supposed, though wrongly, to be of Roman origin. The Greeks certainly had them, and specimens have also been found of them of late mediæval times. The particular collection described was found in a space above the portico of the house of L. Cæcilius Jocundus, who from the contents of the writings on the tablets, has been very generally considered to have been a banker in Pompeii. Of 132 incribed tablets discovered, considerable portions of about 125 have been deciphered, and a remarkable collection of names connected with Pompeiian history, and known also in many cases from other sources, have been recovered.

ROYAL INSTITUTION.

Dec. 3rd.—G. Busk, Esq., Treasurer and Vice-President, in the chair. The Earl Stanhope, Colonel H. M. Norris, Mr. J. L. Sampson, Mrs. R. S. Faulconer, Mrs. H. Pollock, and Miss E. M. Steedman were elected members.

SOCIETY OF ARTS.

Nov. 28th.—Professor C. Foster in the chair. The paper read was by Brofessor Bell, 'On the Telephone.'

Dec. 5th.—Sir C. Reed in the chair. The paper read was by the Rev. E. F. MacCarthy, 'On the Weak Points of the Education Code.'

Dec. 12th.—Mr. W. Hawes in the chair. The paper read was 'On Freedom in the Growth and Sale of the Crops of the Farm, considered in Relation to the Interests of the Landowner and Tenant Farmer,' by Dr. J. B. Laws.

ENTOMOLOGICAL SOCIETY.

Dec. 5th.—J. W. Dunning, Esq., V.P., in the chair. Mr. W. L. Distant exhibited specimens of 'Tetroxia Beauvoisii and Oncocephalus subspinosus,' two rare species of Hemiptera-Heteroptera, from the West Coast of Africa. Mr. F. Smith exhibited a fine series of both sexes of 'Macropis labiata' captured by Mr. I. Bridgman, near Norwich. Mr. Smith likewise exhibited a specimen of 'Rophites quinquespinosus,' taken near Hastings by the Rev. E. Bloomfield, this insect adding a new genus and species to the British Hymenoptera. Mr. Meldola exhibited three photographic enlargements of micro-photographs taken by Mr. E. Viles, and recently exhibited at the Photographic Society's Exhibition. Two of the enlargements were of parts of insects. Mr. Meldola also exhibited an acoustical experiment, in illustration of the action of the stridulating apparatus of the Phasma (Pterinoxylus) brought under the notice of the Society at the last meeting by Mr. Wood-Mason. Mr. Wood-Mason made some further remarks on the structure of the stridulating organs of scorpions. Mr. F. Smith mentioned a case of stridulation occurring in a British species of Curculionidæ (Acalles). Mr. Dunning called attention to a paper in the 'Proceedings' of the Cambridge Philosophical Society for February, 1877, 'On a Striking Instance of Mimicry,' by Mr. N. Goodman. The mimicking insect is a species of Laphria, and the model the well-known hornet 'Vespa orientalis.' Mr. Smith communicated a paper containing 'Descriptions of New Species of Hymenopterous Insects from New Zealand, collected by Professor Hutton at Otago.' Mr. A. Butler read a paper 'On the Lepidoptera of the Amazons, collected by Dr. J. W. Trail during the years 1873 to 1875.' Dr. Sharp communicated the following papers: 'Descriptions of Eight New Species and a new Genus of Cossonides from New Zealand,' and 'Descriptions of some new Species and a new Genus of Rhyncophorous Coleoptera from the Hawaiian Islands.'

ASTRONOMICAL SOCIETY.

Dec. 14th.—W. Huggins, Esq., President, in the chair. Mr. A. Schuster and Mr. C. J. Lambert were elected Fellows. A paper by Mr. Wilson was read, on a special case of the most probable result of a number of observations. The paper pointed out that if observations are weighted with weights intersely proportional to the difference bevween the observation and the final result, the series of observations being arranged in order of magnitude, the middle observation may, if the number of observations is odd, be taken as the most probable result. This remarkable conclusion will be made evident by considering the analogy of a rod without weight on which a number of rings of different weights can be disposed so that the distance of any ring from the centre of the rod is inversely proportional to the weight of the ring: thus a ring at a distance x will have a weight $\frac{1}{x}$ and all the rings will have the same moment about the centre of the rod. If the number of rings be odd, it is evident that the rod will balance about the middle ring; but if the number of rings be even, the rod will balance at any point between the two middle rings. Mr. Ranyard drew attention to an important paper by Dr. Wolf, of Zurich, which will shortly be published, in French, in the forty-third volume of the 'Memoirs.' Dr. Wolf gives an account of his labours during the last forty years in collecting information with regard to the periodicity of Sun spots. One of the most remarkable results deduced from a comparison of these observations is the fact that the average divergence of the Sun-spot period from the mean period of 11·11 years amounts to as much as 2·03 years; the time which elapses between two consecutive maxima is sometimes as long as fifteen or sixteen years, while at other times it amounts to only seven years. Mr. Boys read a paper on an Astronomical Clock, with a pendulum swinging in an exhausted cylinder. It is kept oscillating by means of two magnets outside the glass case, which are alternately brought into play. Lord Lindsay described some observations which he had made with a new form of spectroscopic arrangement, by which he is enabled to obtain the integration spectrum of any small area of the heavens he may desire The diameter of the field over which the light is integrated depends upon the power made use of, and the angular aperture of the collimator of the spectroscope.

NEW SHAKSPERE SOCIETY.

Dec. 16th.—J. Gairdner, Esq., in the chair. Three Members were elected. A paper 'On the Sources of Henry the Fifth,' by Mr. W. G. Stone, was read. The writer compared the play scene by scene with corresponding passages from the reign of Henry the Fifth in Holigshed's chronicles. To this source it appeared that, with one or two trifling exceptions, Shakspere was indebted for the historical matter of his play. It was suggested that the episode of Ancient Pistol and the French soldier (act iv. sc. 7) might have been derived from a somewhat similar scene in the 'Famous Victories of Henry the Fifth' (Shakspere's Library, Part II., i. 368). The wooing scene in tge 'Famous Victorien' was also compared with the similar scene is 'Henry the Fifth.' The 'crux' pointed out bp Johnson (Valiorum Shakspere, xvii. 440), namely, that in act iv. scene 7, Henry would seem to order his prisoner's throats to be cut again, was dealt with, and explained by a reference to the stage directions in the folio for act 4, scenes 6 and 7, and also to the account in Holinshed of the last phase of the battle. The latter explanation had been previously offered by M. Mason (Variorum Shakspere, xvii. 441); Shakspere was shown to haue adhered closely to the authority, and in only two instances, the most important being the embassy of Exeter, to have altered the order of events. In the note to this paper, which has been written as an Introduction to a revised edition of 'Henry the Fifth' undertaken by Mr. Stone for the New Shakspere Society, the historical sources of the 'Chronicles,' as far as Henry the Fifth's reign is concerned, were traced. The paper concluded with a sketch of Henry's character as delineated by Shakspere; the general summing-up of the king's character in the 'Chronicles' was compared here. In this part of the paper Mr. Stone attempted to explain and justify Henry's questionable utterance in 'Henry the Fourth,' i. 2. ll. 219—241.

ANTHROPOLOGICAL INSTITUTE.

Nov. 27.—Mr. Evans, President, in the chair. The election of five new members was announced. Major-General Lane Fox exhibited various objects from Istria and Scinde. A paper read by Captain Hunter "On Socotra," was read, in which, while describing the island, some of Lieut. Wellstead's statements were criticised. A paper "On the Zaparos in Equador," by Mr. A.

Simson, was read, in which many interesting personal observations of these tribes were recorded. The writer noted their wonderful tracking powers, their abstention from heavy meats, such as that of tapir and peccari, their mode of training dogs, and the delight experienced by them in the taking of life, human or animal, except in the case of the alligator. Their modes of courtship were described, and they were spoken of as wandering about in hordes, the worst of which are the Supinus, and being of a happy disposition, but very superstitious, poor, and nearly nude. A paper 'On the Malayo-Polynesians,' by the Rev. S. Whitmee, was read, in which the author noted the high social position of women in the Samoan Islands as compared with that among the black Polynesians; also the existence of hereditary ranks and titles among the brown Polynesians, which seemed to him to point to a former higher state of civilization. The difficulties experienced by missionaries in obtaining the true versions of myths were also noted, and the custom of having two versions of each myth, one in prose, and the other in verse, by checking one of which against the other any variation or alteration was prevented. Major-General Lane Fox, Messrs. Hyde Clarke, Blackmore, and others took part in the discussions on the above.

CHEMICAL SOCIETY.

DEC. 6TH.—The President in the chair. The following papers were read: 'On Gallium,' by Mr. W. Odling. The properties of the metal, its cloride and sulphate, and their reactions, were given and specimens exhibited. 'On Nitrification, a Report of Experiments conducted in the Rothamsted Laboratory,' by R. Warrington. Schloesing and Muntz have shown that nitrification is due to the action of an organized ferment, whose action is suspended by chloroform. The author has completely confirmed the above statement, and has proved that carbolic acid and bisulphide of carbon also stop the action of the ferment, and, moreover, that darkness is essential for the process. The author has succeeded in converting a dilute solution of ammonium chloride into a nitrate by seeding it with some earth from a fairy ring and keeping it in the dark for three months. 'On Potable Waters,' by M. E. Mills. The author investigates the minute errors incidental to the process of Frankland and Armstrong with great care, suggests a new form of evaporator, and arrives at three natural constants or ratios of organic carbon to organic nitrogen in potable waters. 'On some Derivatives of Allylacetone,' by Mr. J. R. Crow. By the action of sodium, a secondary alcohol homologous with allyl alcohol was prepared; its acetate and dibromide were also investigated. 'On a Fourth Method for estimating Bismuth volumetrically,' by Mr. M. P. Muir. The bismuth is precipitated as oxalate, the latter on boiling is converted into a basic oxalate, the precipitate is well washed, dissolved in hydrochloric acid, and the solution titrated with permanganate. 'On the Gas of the Grotto del Cane,' by Mr. T. G. Young. This gas contains 61-71 per cent. of carbonic acid, the residual air having the composition oxygen 20·25, nitrogen 79·75. 'Note on Tetrabromide of Tin,' by Messrs. T. Carnelly and L. T. O'Shea. This body was obtained as a colourless liquid solidifying to a mass of colourless crystals; melts at 30 deg. C, boils 201 deg.

LINNEAN SOCIETY.

NOV. 15TH.—Dr. Gwyn Jeffreys, V.P., in the chair.—Messrs. W. S. Lawson, W, Joshua, and the Rev. A. M. Mactherd were elected Fellows. Mr. Jenner Weir exhibited a case of Alpine Butterflies from 9,000 feet altitude, interesting for their similarity to, though not specifically identical with, those obtained by the naturalists of the Polar Expedition. Three papers on the Arctic Fauna were read:—1. 'Report on the Insecta, including Arichnida, collected by Captain Fielden and Mr. Hart during the recent Arctic Expedition,' by Mr. R. M'Lachlan. It seems they were obtained of Hymenoptera 5, Coleoptera 1, Lepidoptera 13, Diptera 15, Hemiptera 1, Mallophaga 7, Collembola 3, Araneida 6, and of Acarida 6 species, namely, a total of 57 species. Bearing in mind these are from localities between 78 deg. and 83 deg. N. latitude, that amongst them are 35 specimens of gaily coloured butterflies, and two species of humble bees, and it becomes evident the insect Fauna of this so-called 'Land of Desolation' is after all not so meagre as anticipated. The paucity of beetles and abundance of butterflies are each striking features. From variations in certain well-known species obtained, Mr. M'Lachlan suspects they represent a local Fauna, and he regards the latter as having affinity to the Lapland Fauna, inclining to think both are but lingering remnants of a former and once extensive circumpolar Fauna. 2. 'Preliminary Notice on the Surface Fauna of the Arctic Seas, as observed in the Recent Arctic Expedition,' by Dr. E. L. Moss. The author observes that the seas north of the Greenland settlements are subject to such varying conditions at different seasons of the year that their surface Fauna cannot be supposed to be very constant. Nevertheless, judging from what fell under his observation during the voyage, he divides the watery area into three zoological regions:—(*a*) a district in the latitude of Melville Bay, temporarily monopolized by Infusorian Peridinea; (*b*) a north water region inhabited by Pteropods, Tunicates, and Hydrozoa; and (*c*) a subglacial region, comparatively lifeless so far as sea-surface applies. 3. 'On the Annelids of the British North Polar Expedition (1875-6),' by Dr. W. C. M'Intosh. This collection, dredged between 70 deg. and 83 deg. N. latitude, was not so rich in numbers or species as that procured by the storeship Valorous in Davis Straits, but some eight species were got which were not among the latter's collection. None are new, but notwithstanding they help to render clear some obscure points in the geographical distribution of the marine worms, inasmuch as the circumpolar area is concerned. Dr. H. Trimen, in making some remarks on the variability of the foliage of the species of Boswellia, expressed the opinion that 'B. Bhau-Dijiana,' Birdw., was not specifically separable from 'B. Ctrterii.' The 'B. Frereana,' which yields the fragrant resin called 'Luban Metyi,' and which Hanbury considered to be the African 'Elemi,' is much chewed by Orientals, but rarely imported into England. It is found wild in the Somali-land, where it was recently collected by Hildebrandt.

Dec. 6th.—Prof. Allman in the chair.—Prof. Macoun, Messrs. J. Nugent-Fitch, J. S. Gamble, F. S. Piggott, and A. B. Stewart were elected Fellows. Mr. M. Moggridge read a note on the occurrence at Wallis Down, a heath near Bournemouth, of 'Dabeocia poliofolia.' A paper 'On Certain Organs of the Cidaridæ' was communicated by Mr. C. Stewart, who illustrated, among others. the following points in his recent investigations. Among the Sea Urchins the families Diadematidæ, Echinometridæ, and Echinidæ have long been known to possess external branchiæ, though the existence of such in the Cidaridæ has been denied by Muller, and insisted on by A. Agassiz. Mr. Stewart finds in 'Dorocidaris papillata' fine organs corresponding to branchiæ, but situated internally. The water, bathing these interior gills, finds ingress and egress by a crevice near the 'compasses,' the peculiar mechanism of the teeth and jaws producing the temporary opening in question. As respects the pedicillariæ of Cidaridæ, when the jaw ends in a terminal hollowed fang there is an additional orifice to that at the tip, and he suggests that through it a poison is ejected, which latter is secreted by two glands in the vicinity; these structural peculiarities he compares with the falces of the spider and poison apparatus of venomous serpents. The Secretary read a paper by I. B. Balfour, 'Observations on the Genus Pandanus.' The substance was given of a 'Report on a Small Collection of Insects obtained by Dr. J. C. Ploem, in Java, with a description of a new Species of Hoplia,' by Mr. C. O. Waterhouse, of the British Museum. The Secretary read a communication by Dr. J. Stirton, 'Notes on the Rev. Mr. Crombie's Paper on the Lichens of the Challenger Expedition,' and another note, by Dr. R. C. A. Prior, relative to the migration of Wild Geese, purported to have passed from North America to the African Coast.

PHOTOGRAPHIC SOCIETY.

DEC. 11.—V. Blanhard, Esq., V.P., in the chair. Papers were read by Captain Abney, "On Fog-producing Emulsions and their Rectification," and H. Berkley, "On Emulsions."

MATHEMATICAL SOCIETY.

DEC. 13.—C. W. Merrifield, Esq., V.P., in the chair. The Rev. W. Ellis was elected a member. Mr. Roberts read a paper "On Normals," which contained theorems depending on the invariants and covariants of the quartic equation, representing a pencil of four normals to a conic, and drew attention to the remarkable cubic locus of the points of possible convenience of three normals at the vertices of a given inscribed triangle. Dr. Hurst and Mr. Walker spoke on the subject of the paper. Prof. Cayley spoke on "The Geometrical Representation of Imaginary Quantities and the Real (m, n) Correspondence of Two Planes."

THE INSTITUTION OF CIVIL ENGINEERS.

DEC. 4TH.—Mr. G. R. Stephenson, President, in the chair. The monthly ballot resulted in the election of eighty-five candidates, of whom eleven were members, and seventy-four associates.

Dec. 11th.—Mr. G. R. Stephenson, President, in the chair. The paper read was, 'A Description of Cofferdams used at Dublin, Birkenhead, and Hull,' by Mr. J. W. Doherty.

Dec. 18.—Annual General Meeting.—Mr. G. R. Stephenson, President, in the chair. The report was read and adopted after a long discussion. The following gentlemen have been elected to fill the several offices in the Council for the ensuing year: Mr. J. F. Bateman, President; Mr. J. Abernethy, Sir W. G. Armstrong, Mr. W. H. Barlow, and J. Brunlees, Vice-Presidents; Sir. J. W. Bazalgette, Sir J. Coode, Sir J. Whitworth, Messrs. Baker, Bramwell, Bruce, Froude, Lyster, Pole, Siemens, Stevenson, and Woods, members; and Col. H. Hyde, Mr. Knight, and Major-General Scott, Associates.

SOCIETY OF ENGINEERS.

DEC. 3RD.—Mr. T. Cargill, C.E., President, in the chair. A paper was read 'On Tube Wells for Large Supplies and in Various Strata.'

PHYSICAL SOCIETY.

DEC. 1ST.—Prof. G. C. Foster, President in the chair. Prof. G. Bell exhibited and described the telephone, prefacing his account by a sketch of the progress of electric telephony. Reiss was the first to employ the human voice in his experiments. Prof. Bell examined the phenomena which take place when sounds are transmitted through the air. It is, of course, not the motion of the vocal organs themselves that is received in the ear, but that of the air set in motion by their means, and all peculiarities in the sound must be peculiarities in the motion of that air. If the rapidity of motion varies, it occasions a variation in the pitch, and the loudness is changed by changing the amplitude. The shape of the vibration produces 'timbre.' If by moving the air in certain specified ways certain vowel sounds are given out, then those same sounds will be emitted if an identical movement be occasioned by any mechanical means whatever, and Prof. Bell has found that such a motion may really be given to the air in various ways. Three classes of electrical currents have been employed for transmitting sounds to a distance, and these he denominates intermittent, pulsatory, and undulatory. The first form is obtained when a current passes for a brief interval, is then followed by an interval during which no current passes, and this by a current of the same or opposite sign. In the second class a current is continually passing, but its intensity increases and decreases instantaneously, and finally, in the third class, this voriation takes place gradually, and may, therefore, be represented by a sinuous line. In his experiments on the nature of the movement of the air, Prof. Bell employed a human ear, a hay style attached to the incus recording the movement communicated to it on a moving sheet of smoked glass. A very interesting series of curves produced by this means was shown upon the screen, and he explained how his experiments in this direction led him to the present form of telephone. Since the very small membrane of fhe ear was capable of setting in motion comparatively large bones, it seemed probable that it could cause a light piece of iron to vibrate. In the earlier form of apparatus a piece of steel spring was therefore attached to a stretched membrane of goldbeater's skin, and placed in front of the pole of the magnet, but he found on increasing the area of metal that the action of the instrument was improved, and thus was led to do away with the membrane itself. Another branch of the investigation referred to the strength of the magnet employed, and this was modified by varying the strength of current. The battery was gradually reduced from fifty cells to none at all, and still the effects were observed, in a much less marked degree; the action was in this latter case doubtless due to residual magnetism, hence in the present form of apparatus a permanent magnet is employed. Lastly, the effect of varying the dimensions of the coil of wire was studied when it was found that the sounds became louder as its length was diminished. A certain length was, however, ultimately reached, beyond which, no improvement was effected, and it was found to be only necessary to enclose one end of the magnet in the coil of wire. A number of diagrams were projected on to the screen, which showed the various forms the apparatus has taken from the time of Page to the present day. An air sung in a distant part of the building was distinctly hesrd in the room by the aid of an improued form of Reiss's telephone, lent by Prof. Barret, and made by Mr. Yates, of Dublin. Prof. Bell, Prof. Foster, and Dr. Gladstone then carried on a conversation with a gentleman at a distance, utterances were shown to be audible when the transmitting instrument was held about a foot from the mouth. In replying to various questions, Prof. Bell stated that his attempt to determine the amplitude of the vibration had not been successful, and he it coming to the conclusion that the movement must be molecular. Very distinct sounds are emitted when a considerable mass of iron is employed, and further, if the iron be glued to a piece of wood an inch thick, and rhis be interposed between it and the magnet, the action still continues. Conversation has been earried on through a distance of 258 miles, but a resistance of 60,000 ohms has been interposed without preventing the action. There is a very marked difference in the manner in which letters are reproduced by the telephone. Vowel sounds are more acceptable than consonants, and, as a rule, those letters are best transmitted which involve a large oral aperture in their utterance. Finally, he finds that high sounds are produced more fully than low ones, but this question has not yet received sufficient attention.

Dec. 15th.—Professor G. Foster, President in the chair. The following candidates were elected Members: Lord Rayleigh, Messrs. W. Ayrton, M. Cameron, J. Clark, J. Judson, H. Moseley, W. Stocker, and H. Wood. Mr. C. Cooke read for the author, Professor S. Thompson, a paper 'On Permanent Plateau Films,' and exhibited the process of their formation. Mr. S. Taylor exhibited some experiments in illustration of a paper on the colours exhibited by vibrating liquid films which he has recently communicated to the Royal Society. Dr. Guthrie exhibited a simple lecture illustration of the action of the telephone.

HISTORICAL SOCIETY.

Dec. 13th.—Dr. B. W. Richardson in the chair. Six members were admitted by ballot. Dr. G. Harris read the third part of a paper, entitled 'Domestic Every-day Life, Manners and Customs in this Country from the earliest Period to the end of the Eighteenth Century.' A second paper 'On the Early Intercourse of the Danes and Franks' was read by Mr. Howorth.

ZOOLOGICAL SOCIETY.

Nov. 20th.—Prof. Flower, V.P., in the chair.—The Secretary read a Report on the additions made to the Society's Menagerie during October. Communications were read from the Marquis of Tweeddale on a collection of birds made by Mr. A. H. Everett in the Island of Zebu, Philippines: six new species were found in this collection, three from Dr. O. Finsch (1) 'On a Collection of Birds made at Eua, Friendly Islands, by Mr. F. Hubner;' (2) 'On a Collection of Birds made on the Island of Ponape, Eastern Carolinas, by Mr. J. Kubary;' (3) 'On the Birds obtained at Ninafou Island in the Pacific, by Mr. F. Hubner.' By Professor Garrod, 'On the Tænia of the Rhinoceros of the Sunderbunds (Plagiotænia gigantea);' 'On the Anatomy of the Chinese Water Deer (Hydropates inermis);' 'On the possible Cause of Death in a Young Seal;' and 'On the Occurrence of a Gall bladder in certain species of Parrots.' By Mr. H. Saunders, 'On the Laride collected during the voyage of H.M.S. Challenger,' which comprised 9 species of Sternæ, 5 of Larinæ, and 3 of Stercorarinæ, altogether 17 species, represented by 47 specimens: from Dr. A. B. Meyer, containing additional proofs of the fact that the Red Eclecti are the females of the green species of that genus, and by Mr. G. F. Angas, 'On Helix sepulcharalis of Ferrusac and its Allies, with Descriptions of two new Species.'

Dec. 4th.—Prof. Newton, V.P., in the chair. The Secretary read a Report on the additions that had been made to the Society's menagerie during November, 1877. Mr. H. Seebohm exhibited and made remarks upon some of the rarer eggs and birds which he had obtained during his recent visit to Eastern Siberia. Mr. Saville Kent exhibited the plans of a Zoological Station and Museum and Institute of Pisciculture to be established at St. Helier's, Jersey. The Secretary exhibited on the part of Mr. A. Anderson, some specimens of natural history collected in India, amongst which were chicks of Rhynehops and specimens of 'Podiceps cristatus' obtained breeding in North-Western India. Communications and papers were read: from Mr. H. Lee, 'On the Capture of a Risso's Grampus at Sidlesham, near Chichester,' by Mr. A. G. Butler, 'On a Collection of Lepidoptera made in Northern Formosa by Mr. H. E. Hobson,' and from the Marquis of Tweeddale, containing an account of a collection of birds made by Mr. A. H. Everett in the Island of Mindanao, Philippines. Eight new species were found in this collection.

MICROSCOPICAL SOCIETY.

Dec. 5th.—H. C. Sorby, Esq., President, in the chair.—Four new Fellows were elected. The President announced that, in consequence of the death of Dr. Lawson, it had become necessary to reconsider the subject of publication, and the Council had, after careful attention to the matter, decided in future to publish their own proceedings. A paper by Herr Zeiss, 'On Abbe's Apertometer,' was read by Mr. Ingpen, who exhibited the apparatus to the meeting. Mr. Ingpen also described the method of measuring angular apertures last adopted by Mr. Wenham, which that gentleman considered gave the true critical angle of an objective. A paper by Mr. F. A. Bedwell, 'On Cephalosyphon,' was read by Mr. Slack, who afterwards explained the structure of this rotifer, and pointed out the special features to which attention was drawn by the author of the paper. Another paper by the same author, 'On a new Method of examining Actinium Mesembryanthemum,' was read by Mr. C. Stewart; it was illustrated by drawings, some of which were enlarged upon the black-board. A discussion on the subject afterwards took place.

PHILOLOGICAL SOCIETY.

Dec. 7th.—Rev. Dr. R. Morris, V.P., in the chair.—Mr. A. M. Anderson was elected a Member. Mr. A. J. Ellis read a paper, 'On the Anglo-Cymric Score,' which has been lately spoken of as 'the Ancient British Numerals.' In 1870 he printed one of these scores in the 'Philological Transactions,' believed to be the first published. In February, 1874, he laid twenty-five different versions before the Philological Society, but only printed them in proof, as he was waiting for more information. This evening he minutely examined forty-four versions, including seven received from America, and there attributed to the Indians. The conclusions he drew from this complete investigation were as follows: 1. This score is a real system of counting, at least two or three hundred years old, which, however, was rare fifty years ago. 2. It was actually used in counting sheep (six informants), and was heard so used by one living informant. It has sunk to be used for counting stitches in knitting (two cases), or for amusing children (seven cases), or for 'counting out' at school (at least seven cases). To this last use is probably due many of the anomalous words, as shown by other countings out, of which eight were cited. 3. That is was foreign to those who used it, and was in England attributed to Scotch drovers (four cases). The ease of its importation was shown by the existence of seven American versions attributed to the Indians. As the score is totally unlike the Gaelic cr American numerals, these hypotheses are worthless. 4. The names of the numerals 1, 4, 5, 10, 15, 20, can all be easily connected with Welsh. The names of 16, 17, 18, 19, as 1 and 15, 2 and 15, 3 and 15, 4 and 15, are peculiar to Welsh among all known Celtic languages, and are consistently employed in the score. Hence the foundation of the score must be Welsh, unless the unknown Celtic of Strathclyde had the same peculiarity. But the absolute divergence of the names for 2, 3, 6, 7, 8, 9, from any Celtic type, and the comparative ease with which they can be accounted for on the 'counting out' principle, invalidates the theory of indigenous growth and favours importation. How it was imported into England is as little known as how it was imported into America, where it was known in 1717, and recollected by a man as an old affair, who was eighty-one in

1868. 5. There is no ground at all for supposing that the extraordinary words for 2, 3, 6, 7, 8, 9, were 'the Ancient British Numerals,' but there is strong ground for attributing them to the influence of swing and rhyme (predominant for the pairs 1 and 2, 3 and 4, 6 and 7, 8 and 9, but non-existent in Celtic numerals), as in countings out and nursery jingles, from which the score is still used. 6. The score possesses no linguistic interest, as the discovery of a lost system of numerals, and its real philological value is the illustration it gives of the alteration of words in passing from mouth to mouth without being fixed in writing, and the tenacity with which constructions cling (like that of 16, 17, 18, 19, in the score) when the materials vary. A paper, by M. Metivier, On 'Gallow' (to dazzle) in 'King Lear,' iii. 2, was read by Mr. B. Dawson.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

Dec. 4th.—S. Birch, LL.D., F.S.A., President, in the chair.—The following papers were read: 'On some early Babylonian or Akkadian Antiquities,' by Mr. W. St. Chad Boscowen; 'Notes upon the Assyrian Despatch and Report Tablet,' by Mr. T. G. Pinches; and 'On the Mythology of Pasht and the Cat in Egypt and in Prehistoric Times,' by Mr. Hyde Clarke.

ASIATIC SOCIETY.

Nov. 19th.—J. Fergusson, Esq., V.P., in the chair.—A paper, contributed by Captain Forbes, 'On the Connection of the Mons of Pegu with the Koles of Central India,' was read, in which the writer controverted, at some length. the views which had been advanced on this subject by Dr. Mason and Sir A. Phayre, and expressed a decided opinion on his own part that what we now knew of the languages of these peoples did not confirm the idea of any race-connection between them. The Rev. S. Beal then brought before the notice of the meeting the interesting fact that he had discovered among the books of the Buddhist Tripitaka sent from Japan to the India Office a version of the Sakhya Karika, of Kapila. It is called 'The Seventy Golden Shaster,' and is said in the Bhashya or Commentary to have been revealed by Kapila to Asuri, and by him declared to Pancasikha, and finally to have come down to Ishwara Krishna, who committed it to writing. The Karikas, or Aphorisms, agree in a marked manner with the Sanskrit.

Dec. 17th.—J. Ferguson, Esq.,V.P., in the chair. The following gentlemen were elected as resident members: Sir W. Merewether, Syed Mustapha ben Yufaf, Rev. L. Sabanjie, Col. W. E. Marshall, Rev. H. T. Woolrych, Messrs. F. W. Madden, W. T. Sinclair, D. C. Boulger and J. D. Mayne; and as Non-resident, Messrs. Gessen da Ounha, R. Sewell, T. B. Edwards, W. Ferguson, and H. G. Keene. A paper was read, contributed by Mr. D. C. Boulger, 'On China via Tibet,' in which he pointed out the great value to this country of the convention recently signed by Sir T. Wade, which, for the first time, secures free intercourse between India and Tibet, and thereby opens out to India a direct mercantile communication with China, through the Himalayan passes of Sikkim and Bhatan.

QUEKETT MICROSCOPICAL.

Nov. 23rd.—H. Lee, Esq., President, in the chair.—Six new members were elected.—It was announced that arrangements had been made for elementary instruction upon the use of the microscope at the intermediate meetings of the Society. Mr. Ingpen communicated a method adopted by Dr. Edmunds for mounting test-objects in such a way that both sides could be viewed with equal facility. Mr. S. J. M'Intire described and exhibited the living larvæ of the cat flea. M. J. G. Waller read a paper 'On a New British Sponge of the Genus Microciona,' for which he proposed the name 'M. bihamigera.' The subject was illustrated by diagrams and by a specimen of the new sponge from Torbay. Mr. C. Stewart gave a resume of the general characteristics of the Spongidæ, freely illustrating his remarks by black-board drawings.

GEOGRAPHICAL SOCIETY.

Dec. 10th.—Sir R. Alcock, President, in the chair.—The following gentlemen were elected Fellows: Lieut.-Col. G. Hume, Rev. W. Baker, Rev. S. W. Stott, Messrs. G. Dewdney, J. S. Dyason, T. H. S. Escott, T. M. Gisborne, E. Hight, W. K. James, J. King, W. M. Macdonald, J. E. Mills, W. L. Shadwell, and E. Wadham. Lecture, 'On the Formation of the Main Masses of the Land,' by Professor P. M. Duncan.

GEOLOGICAL SOCIETY.

Nov. 21st.—J. Evans, Esq., D.C.L., V.P., in the chair.—Messrs. O. Fitch, J. Hadkinson, B. Holgate, H, F. Parsons, and E. P. Rathbone were elected Fellows. The following communications were read: 'On the Glacial Deposits of West Cheshire, together with Lists of the Fauna found in the Drift of Cheshire and adjoining Counties,' by Mr. W. Shone; and 'The Moffat Series,' by Mr. C. Lapworth.

Dec. 5th.—Prof. P. M. Duncan, President, in the chair.—Rev. J. Hodson, Messrs. I. B. Balfour, D. Burns, S. Cooke, H. Drummond, S. Fleming, W. E. Jennings, H. Merryweather, R. Robinson, M. Stewart, G. E. Thoms, R. F. Tomes, and I. J. Whitty, were elected Fellows. The following communications were read: On the Building-up of the White Sinter Terraces of Roto-Mahana, New Zealand,' by the Rev. R. Abbay; 'Additional Notes on the Dimetian and Pebidian Rocks of Pembrokeshire,' and 'On some Precambrian (Dimetian and Pebidian) Rocks in Caernarvonshire,' by Mr. H. Hicks; and 'On the Precambrian Rocks of Bangor,' by Professor T. M'K. Hughes.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

Dec. 5th.—T. Morgan, Esq., V.P., in the chair.—The completion of the most pressing repairs to uphold the ruins of Denbigh Castle was announced. Notices were made of the discovery of various traces of the old Priory of St. James, Derby, by Mr. A. Wallis. The discovery of three Roman villas was reported in addition to the important excavations at Templeborough. The first of these is at Abinger, near Dorking, in a district not hitherto remarkable for Roman remains, notwithstanding the proximity of the Stane Street Road. Traces of several chambers with tesselated pavements have already been met with. The second is at Itchen Abbas, Hants, and Dr. Stevens reported that some trivial excavations had shown the existence of two tesselated pavements and a system of heating almost perfect. The uncovering of these buried remains promises results of interest. Dr. Stevens, in a paper read by Mr. Previte, gave a description of a third villa at Preston, near Brighton. Here several apartments were opened and various antiquarian relics found, many of which are now in the Brighton Museum. Mr. J. S. Leader described the exploration of the Roman castrum at Templeborough, near Rotherham, which is being excavated by local subscription. Traces of two, if not three, occupations have been found, and the area of a large building has been opened, remarkable for a portico of four columns to the south front, and a long colonnaded range to the east of smaller columns. The bases only remain, but one shaft nine feet long was found entire in one stone. This building had evidently been ruined and afterwards rebuilt, for the bases were found walled up in later Roman work. Several of the bricks were inscribed CIIII G (Cohors III. Gallorum). This body of auxiliaries has left several records of its presence along the great Roman wall, but this is probably the first indication of its presence elsewhere in Britain. A discussion followed, and Mr. L. Brock, who read the paper in Mr. Leader's absence, pointed out that the columns could only have supported a timber superstructure, since the columns were twenty-two feet apart.

ARCHÆOLOGICAL INSTITUTE.

Dec. 7th.—R. H. Smith, Esq., V.P., in the chair.—Allusion was made by the Chairman to the arrival of Dr. Schliemann's gold treasury and pottery from Troy, shortly to be exhibited at South Kensington. Of this extraordinary collection the magnificent gold cup was specially remarked upon. Mr P. Harrison read some notes on the recent explorations at Cissbury. These galleries in the chalk were evidently made originally for the purpose of getting flint, that material, when obtained at a certain depth, being easily chipped into weapons The galleries appeared to have been also used as shelter places from the weather, or from an enemy, and Tacitus mentions a similar use of such retreats by the people of Germania. Among the objects exhibited were several different kinds of pottery, deer horn tips, bones of animals, a bone carding comb, an iron hook, a terra-cotta head, and pieces of chalk with markings on them, pronounced by Profs. Rice and Burgess to be "rune-like." No human remains were found. Major-General Lane Fox took a different view of the matter. He considered that the galleries were filled in at once, after the flints had been taken out, in order to get rid of the débris; he he thought the pits where the pottery, &c., were found were probably refuse pits, as at Mount Caburn. A vote of thanks was passed to Mr. Harrison for the patient care with which he had conducted a difficult and elaborate exploration. Mr. Bain read a paper 'On the Siege of Antwerp by Alexander of Parma,' entering at some length into the details of this celebrated event. Mr. W. J. B. Smith sent some notes on the details of a remarkable casket belonging to the Rev. T. Hopkins. Lord Brougham and Vaux exhibited an altar cross, a crucifix, a pix, and a chasse. These were considered by the Chairman as of the school of Cologne, and of the thirteenth century; a reliquary of a later period was also shown; the whole of these objects with some others were discovered walled up in the chapel at Brougham. The Rev. B. B. Oakeley sent a rubbing of the figure of a Verderer of the Forest of Dean, from Newland Churchyard, of the time of James the First, holding a bow and wearing arrows in his belt. An example of a forester of the fourteenth century, similarly armed, was mentioned by Mr. Hartshorne in the church of Glinton, near Peterborough. Mr. Greaves exhibited a rubbing of a cross of a peculiar kind on a monumental slab at Hastings, and rubbings of a set of emblems of the Passion on a font at the same place.

ITALIAN INTERNATIONAL EXHIBITION, 1879.

An International Exhibition, undar the patronage of His Royal Highness the Prince Humbert, and organised by an influential National Committee, is to be held at Milan in 1879. The municipality have granted the use of an eligible site for the building, with ample open-air space for an agricultural department. The "Commissaire Delegue" for the United Kingdom is Mr. Edmund Johnson, of Castle Street, Holborn, to whom all communications from intending British and Colonial Exhibitors should be addressed. General Regulations will shortly be published.

CHRONOLOGICAL LIST OF APPLICATIONS FOR LETTERS PATENT.

⁂ In this list (Com.) means Invention communicated from abroad.

Further information, as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur St., Charing Cross.

On October 31st.—4201 to 4217.—G. D. Mease. Furnaces for decomposing chlorides of sodium and potassium, manufacturing alkalies, and for other such like purposes.—A. Mieg. Apparatus for controlling the taking of aim with firearms. —J. H. Johnson. Mode or means of attaching or securing armour plates to ships, forts, and other like structures (com.)—J. H. Johnson. Glass gauges (com.).—C. W. Ratcliff and F. Ratcliff. Machinery for stripping or doffing fibrous materials from carding machines cylinders, and for drawing or thinning the sliver by the same process.—W. Barker and T. Barker. Carding Engines.—J. Barraclough. Power looms.—W. R. Lake. Method of raising heavy weights (com.)—A. M. Clark. Liquid composition for extinguishing fire (com.)—G. Stevenson. Apparatus for excavating and depositing earth, partly applicable to cranes and for other purposes.—J. C. Kinmond. Machinery or apparatus for rolling tea leaves.—C. D. Abel. Manufacture of wrought-metal plates for bearing loads, and apparatus employed for that purpose (com.)—G. H. Morgan. Carriages.—P. R. de Faucheux d'Humy. Manufacture and ornamentation of articles of glass and pottery.

On November 1st.—4218 to 4234.—N. J. Holmes. Construction of inextinguishable and self-igniting danger flares for railway and other purposes.—F. J. Costa. Method of suspending, raising, and lowering venetian blinds.—J. P. Smith. Permanent way of railways.—W. R. Lake. Pressure indicator for taking continuous diagrams (com.)—G. Zanni. Application of magneto-electricity or magnetism or natural electricity to swimming and other baths for curative and anæsthetic purposes.—J. P. Cross. Method of and apparatus for singeing fabrics. —G. E. Chapman and J. O. Orgill. Railway waggons, pit corves, and other similar vehicles. —T. Galbraith. Hot-air bath or apparatus for the treatment of diseases of the human body.— J. Clark. Winding and making up sewing thread for sale or use, and machinery employed therefor.—J. Holding. Looms for weaving.— J. H. Rogers. Process of cleansing woollen cloths preparatory to the dyeing of the same.— G. O. Talbot. Safes and strong-room doors.— J. Underhill and J. Cartland. Manufacture of metallic butt hinges.—P. Macquay. Machinery for the manufacture of buckle tongues.—J. Heap. Mode or method of raising the pile cover or nap of flannels, cloths, or other materials, and machinery or apparatus used therefor.—J. Heap. Machinery for beaming and sizing woollen, cotton, silk, or other yarns or threads, partly applicable to other purposes.—W. R. Lake. Manufacture of metal pipes or tubes, and machinery therefor.

On November 2nd.—4235 to 4246.—H. S. Barron. Steam generators.—F. A. Kieffer. Manufacture of paper pulp and cardboard, and apparatus employed therein.—F. Wirth. Means of and apparatus for controlling the width between the rails of a railway (com.)—W. R. Lake. Manufacture of metal pipe or tubes, and apparatus therefor (com.)—W. R. Lake. Smoke-consuming or smoke-preventing furnaces (com.) (Complete specification.)—S. L. Worth and J. H. Pontifex. Method of effecting ventilation in waterproof garments.—W. R. Lake. Apparatus for extracting corks from bottles (com.) (Complete specification.)—G. Westinghouse. Speed governors, indicators, and recorders.—B. J. B. Mills. Rails for railways, and mode of producing the same (com.)—A. M. Clark. Apparatus for washing small coal and other mineral substances (com.)—J. W. Hackworth and A. Hackworth. Valve gear applicable to locomotive, marine, and other engines.

On November 3rd.—4247 to 4260.—J. Hodges and J. W. Butler. Manufacture of paving slabs or blocks, and other articles of artificial stone or concrete, and machinery or apparatus employed therein.—H. Brooks. Music stools or seats, and other seats to facilitate effecting variation in the height thereof.—J. Burridge. Tiles.—W. B. Blood. Tricycles.—G. Walker. Construction of solitaires, shirt studs, and other such like fastenings.—C. Bradley and J. Campbell. Machinery for combing wool and other fibres.—J. Bottomley and S. Smith. Spinning and doubling.—G. du Vallon. Mode of using chains in self-sustaining pulley blocks.—J. Turner. Velocipedes.—R. Hempsted and C. H. Holt. Machinery or apparatus employed in the manufacture of cranked shafts or axles.—P. Jensen. Sewing machines (com.)—H. S. S. Watkin. Instruments for obtaining right angles and ascertaining distances.—W. R. Lake. Bale-ties and bale hoop iron (com.) (Complete specification.)—A. M. Clark. Writing pen (com.)

On November 4th.—4261 to 4273.—W. Wiggins. Manufacture of watches to prevent robbery by breaking the bows thereof.—Thomas Mason. Breaking off the jet or break of cast printing types.—G. D. Davis. Machinery for steering vessels by steam or hand power.—R. W. Perkins, F. H. Perkins, and J. Williams. Furnaces for burning anthracite and other fuel.—A. A. Leaker. Cushion for billiard tables.—G. du Vallon. Construction and arrangement of valves for steam engines, and mode of working the same.—T. Startin. Folding carriage steps.—J. Brooks and W. Cooper. Manufacture of anvils. —G. Schaub. Electro-magnetic engines, and means or apparatus for generating thermo-electricity for that purpose, partly applicable to other electrical purposes.—W. R. Lake. Machinery for cutting screws or other articles of regular or irregular form (com.)—W. L. Wise. Steam-boilers and their accompanying devices, and to the relation thereof to the hulls of vessels, especially of small steam yachts (com.)— J. G. Tongue. Jars, bottles, flasks, or other vessels made of glass, earthenware, or metal for containing and preserving fruit and other articles of food (com.)—G. B. E. Galloway. Construction or formation of roadways, and appliances connected therewith.

On November 6th.—4274 to 4294.—J. Henderson. Egg stand for cooking, straining and holding eggs, partly applicable for other like purposes. —P. Black. Construction of wheels for railway and tramway rolling stock.—H. A. Bonneville. Breechloading fire-arm (com.)—A. J. Haworth. Carding engines for carding and cleaning cotton and other fibrous materials.— H. J. Haddan. Machinery for feeding presses and such like with paper or other equivalent material (com.)—H. J. Haddan. Machinery for working hides and leather (com.)—H. J. Haddan. Magnetic-electric machines (com.)—H. J. Haddan. Lubricators for wheels of vehicles (com.)—H. J. Haddan. Grain separators and scourers (com.)—J. S. Gent. Apparatus employed in the manufacture of gas-burners.—S. Simmons. Construction of umbrellas or other similar articles.—R. Marle. Penholders.—N. Chandler. Tea kettles and other similar vessels for heating water.—R. S. Newall. Manufacture of wire rope.—L. A. Aspinwall. Construction of potato diggers.—A. Moser. Telescopes used in instruments for measuring angles.—W. R. Lake. Shovels (com.)—A. M. Clark. Shafts and poles for vehicles (com.)—W. R. Lake. Preparation of wood to facilitate the varnishing or polishing of the same (com.)—W. R. Lake. Machinery for framing match splints for dipping (com.)—T. H. Ward. Cranes, partly applicable to other similar purposes.

On November 7th.—4295 to 4315.—T. Shaw and J. Heap. Construction of annealing pans.—G. Westinghouse. Apparatus for lighting railway carriages (com.)—D. Cutler. Solitaires, sleeve links, shirt, collar, and other studs, and other similar dress fastenings and ornaments.—A. G. Southby. Automatic mashing machines for brewers and distillers.—W. Blake and R. Tebbs. Manufacture of pots for flowers or other plants. —J. H. Johnson. Steam-boilers.—J. H. Johnson. Refining or purifying saccharine and other liquids, and apparatus employed therein.—J. H. Johnson. Manufacture of cigarettes.—W. Illingworth and Carl Zeidler. Machinery or apparatus for making skeps and other baskets. W. Martin. Manufacture and construction of umbrellas, parasols, and sunshades.—B. J. B. Mills. Sheet-metal elbows and curved pipes, and processes and apparatus for making the same.—M. A. Weir. Means and apparatus for balancing and sustaining in position suspended articles.—J. H. Johnson. Pulp engines.—H. E. Newton. Egg boxes or cases.—S. Lane. Oil and spirit lamps and cans.—H. E. Newton. Instrument to be used as a substitute for the ordinary slide-rule.—J. D. Garrett. Manufacture of railway and other wheels, and apparatus used in such manufacture, partly applicable to the welding and shaping of other articles in iron and steel.—A. M. Clark. Electric-light buoy. A. M. Clark. Gear and other wheels to facilitate their attachment to and removal from shafts. H. Roman. Portable receptacle or box for containing various useful articles.—R. Harrington. Nuts for screw-bolts.

On November 8th.—4316 to 4328.—J. Basire and J. H. Howell. Charging and burning fuel in open fires, and means for effecting the same. F. McDiarmid. Cask for malt and other liquors, and taps or cocks to be used therewith, the said taps or cocks being applicable to other vessels. E. Gaudchaux-Picard. Chemically unweaving textile fabrics made of animal and vegetable fibrous substances, for the purpose of utilising by combing silk or wool filaments therefrom. F. Stockman. Construction of lay figures or dummies for exhibiting articles of wearing apparel.—G. Adams. Printing on wire, plain or perforated zinc or other metals, by the ordinary processes of printing for ornamenting blinds, &c.—S. Knowles. Conditioning and ageing printed fabrics, and apparatus employed therein. T. Temple. Means employed for propelling vessels, which dispense with the use of the ordinary marine-engine.—H. P. Holt. Steam tramway locomotives, and machinery and apparatus connected therewith.—J. H. W. Biggs. Apparatus for evaporating brine, and obtaining salt therefrom.—W. H. Thompson. Machinery or apparatus for grinding, pulverizing, and sifting mineral, animal, and vegetable substances. J. G. Tongue. Mowing and reaping machinery. A. Clark. Apparatus for raising and lowering. A. Martin. Boxes and other receptacles for matches, needles, and other articles.

On November 9th.—4329 to 4345.—Mrs. T. L. Wadsworth. Machine for converting loose granular sugar into cubes.—T. Visino. Means and appliances for ascertaining and recording the speed and direction or movement, latitude and longitude, of a vessel.—P. Jensen. Cast-metal pulleys, and method of manufacturing the same.—L. B. Souty. Sliding picture frames. —G. T. Atkinson. Horse-shoes, and attachments therefor.—H. J. Hadddan. Car couplings.

The Palestine Exploration Fund.---The Quarterly statement, January, 1878, is just issued from the press, and gives general information as to the interesting work being carried on in the Holy Land by the aid of Lient. Conder, R.E., Lieut. Kitchner, R.E., and other workers in the cause.

Legalization of Trade Marks Piracy in Germany.—Until the new law in 1874 was passed, property in Trade Marks was not recognised in Germany, the only protection afforded by the Courts there being to restrain the improper use of traders' names. Upon the passing of the law of 1874, which came into operation in the following year, and established a system of registration, the hope was entertained that whatever was lawfully used in other countries as a Trade Mark would be registered in Germany, and that registration would be refused to Marks and labels presented by others than the rightful owners. It now appears that this is not so. Fancy names which are largely employed in this country, in the United States, and elsewhere are, even as old Marks, excluded from registration in the German Empire. In many instances registration has been granted for piracies, and close imitations of well-known Marks and labels, notwithstanding the registration of the originals by the lawful owners. A trade label, which is manifestly designed to make capital for a German house out of the reputation of an English firm (Messrs. Strutt) and an English seat of manufacture. In another case it appears that the marks of four of the best known British cotton manufacturers have all been registered by a German pirate, the same Marks have likewise been accepted from the respective firms here to whom they belong. —*Trade Marks.*

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